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THE
NATURALIST:

Journal of the Yorkshire Naturalists'
Union,

AND

GENERAL FIELD CLUB RECORD.

NEW SERIES.

EDITED BY C. P. HOBKIRK, F.L.S., AND G. T. PORRITT, F.L.S.

VOL. IV, 1878-9.



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The July No. contains an article "On the Moults of the Bill and Palpebral appendages in the Common Puffin, discovered by Dr. Bureau," with Coloured Plate showing the various stages.

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ADDRESS.

THE present number commences our Fourth Volume, and we take the opportunity of addressing a few remarks to our readers and contributors. To the former we tender our thanks for their continued support, and trust that it will not only be continued for the future, but that they will assist us in obtaining new subscribers to the forthcoming volumes, and make an effort to carry out to a successful issue the claims of the "Journal," as indicated in the circular recently issued to the members of the Union. To our contributors our warmest thanks are due, for the valuable papers, notes and queries, sent for publication, and we feel convinced that those whose papers have been delayed, abstracted, or declined, will not attribute to us any want of courtesy to themselves in pursuing the course we have done. Some little discretion must be allowed to us in our editorial capacity, and we can assure all our friends that it is with the greatest reluctance that we find ourselves compelled at times not to insert their communications, or to abridge them. One part of our Journal we are anxious to see developed to a much greater extent than has hitherto been the case, viz., that devoted to short notes and queries. These columns are intended to stimulate observers to keep a keen eye upon all new discoveries, doubtful points, and questions on all branches of natural history which may require elucidation, and to give an opportunity for the discussion amongst our members of any questions which may arise on the distribution, histology, physiology, systematic classification, &c., in any of the sciences which come within our scope. We are glad to find that considerable progress has been made in this direction in our last volume, and hope to see this department more fully developed in each succeeding one. Let none be dismayed at asking questions for fear of showing their ignorance, and we will promise that so far as possible their doubts, questions, or difficulties, will be attended to ; and if we ourselves are incapable of answering them (which may possibly often be the case, as we make no professions of encyclopædic knowledge), some of our contributors will be able and willing to do so,—indeed, in most cases we shall make it a point to give them the preference. It is gratifying to be able to state that the useful papers on "neglected orders" are

already bearing fruit, and some of our members are already beginning to work them up with considerable success, and we sincerely trust that their example will speedily be followed. The harvest is ample enough, it only requires reapers.

As to meetings of Societies, we must ask our friends the secretaries to make their reports as short as possible consistent with their interest, and to report those portions only which may be of general interest, leaving out all extraneous matters; this will save both them and ourselves much labour and not a little disappointment. If they consider that at present the space at our disposal is only limited, they will readily see the reason for this friendly hint.

In conclusion, to all we would say, that as our labours are done *con amore*, give us your best assistance, and we will spare no pains or labour to render your work available and useful, and whenever we find it advisable, or possible, will increase the size of the Journal. Our success depends entirely upon our subscribers and contributors; let them only use their best endeavours to give and get us a fair measure of support, and we will guarantee that their labours shall not be without fruit.

Original Articles.

ON MOSSES.*—(Continued.)

BY WM. WEST.

Forms of thickening are found in the spiral bands of the elaters of hepaticæ and in the theca of mosses. In *Marchantiaceæ* an epidermis is found, as well as on the thecæ of mosses having stomatal perforations, and in the leaf, veins, and stems of the highest mosses, elongated cells are found approaching slightly to a fibro-vascular system. On the foregoing characters is based the primary classification of the *Muscineæ*.

I will now give you the distinguishing characteristics between the two groups of the *Muscineæ*, contrasting them as much as possible, in doing which I shall of necessity repeat something I have already said, but that will not matter if I can succeed in thoroughly showing

* Read before the Bradford Scientific Association, on May 16th, 1877.

to you the separation of the two groups. Mosses develop the sexual generation from the spore with the intervention of a pro-embryo. The hepaticæ develop the sexual generation directly from the spore, or with the intervention of a *small* pro-embryo. The sexual generation of mosses usually has a filiform stem, with leaves in two or more rows, having no bilateral structure, usually monopodial, never dichotomous. The sexual generation in hepaticæ is developed as a flat dichotomous stem or thallus, or finally as a filiform stalk furnished with two or four rows of leaves, and usually having one side applied to an object, and when the stem grows erect there is an apparent tendency to form an under as well as an upper surface. The asexual generation of mosses is formed in the calyptra, which is ruptured at the vaginula, and raised by the sporogonium, enveloping the latter as a cup, and the young capsule produces the spores from an inner layer of tissue, the remaining inner tissue is sterile and produces the columella, the wall of the capsule has an epidermis, and it usually divides into an urn-shaped body and a lid. The asexual generation of the hepaticæ remains surrounded by the calyptra until the ripening of the spores, the calyptra is then ruptured at the apex, and remains at the base of the sporogonium as a sheath, the spore capsule projects above this sheath and the spores are dispersed; the mother-cells of the spores arise either from the whole mass of cells composing the capsule, except the outer layer, or the immediate cells usually develop into elaters.

I shall now confine my remarks to mosses alone. The spore produces a protonema from which the moss, bearing leaves and the sexual organs, arises. The endospore sends out a tube which elongates by apical growth indefinitely, and becomes septate. These form branches close behind the septa, which may produce branches of a higher grade. The part of the endospore opposite the germinating filament may develop into a hyaline rhizoid, which penetrates the ground. The cell-walls of the protonema are at first colourless, but the primary axis, whether laying upon the surface of the ground or penetrating it, soon assumes a brown colour, the right-angled septa of which become oblique. The cells above ground develop chlorophyll grains abundantly, and the protonema is thus nourished in an independent manner by assimilation. It dies at once in most cases after producing lateral buds; but in *Pottia*, *Physcomitrium*, *Phascum*, &c., it retains its vigour after the development of the sporogonium, and here we have the three stages of the cycle of development presented to us simultaneously in genetic connection. In *Sphagnum* the spores produce a flat plate of tissue, the margin of which branches, producing

leafy stems from the surface. *Tetradontium* and *Tetraphis* also produce a flat pro-embryo at the end of the filaments of a protonema. Kühn's investigations on *Andreæa* show that it also differs from the typical mosses, as the contents of the spore divide into four or more cells before bursting. This observer has also shown that the first septum of the protonema is formed within the spore in the true mosses, as *Mnium*, *Leucobryum*, *Hypnum*, and *Bartramia*. The branches of the protonema of *Andreæa* may produce cellular ribbons as well as transverse and longitudinal divisions, and parallel to the surface of these divisions other divisions may be formed, and an aborescent erect portion of the protonema may result, but sometimes a single plate of tissue having a definite outline is the result. The length of the protonema varies from 1 m.m. to 300 m.m. The length of a moss varies from 1 m.m. to over 300 m.m., but the thickness does not vary more than from $\frac{1}{10}$ m.m. to 1 m.m. The leaf-bearing plant springs from the lower cells of the lateral branches of the protonema, and never from the apical cell of a filament of the latter. From the first leaf-forming segments arise the first rhizoids. I might here have gone into the manner in which the branching of the stem originates, but I must be content with saying that the branching is never dichotomous, and probably never axillary, although connected with the leaves. The leaf-tissue of *Sphagnum* and *Leucobryum* is differentiated into cells of definite position, some containing sap, and some air. The stolons of mosses are shoots with none or very small leaves; they creep on or beneath the surface of the soil and then erect themselves as leafy shoots. The lamina expands right and left from the median plane, except in *Fissidens*, and here it is expanded in the median plane itself, proceeding from an almost sheathing base. The rhizoids or root-hairs are plentifully developed except in *Sphagnum*, and are not morphologically distinct from the protonema; they certainly do not contain chlorophyll, and they likewise tend to grow downwards, but they sometimes develop single branches as a protonema growing upwards, and the protonema also develops rhizoids. To cause the protonema to be developed from the rhizoids, keep a turf of moss turned upside down and damp for a few days, when protonema will be developed, bearing plants in abundance.

We have seen that the usual method of reproduction is by means of the spores of the sporogonium, which sporogonium was proved to be equivalent to the entire leafy and rooting spore-producing plant of vas-vascular cryptogams, in 1851, by Hoffmeister, and is one of the finest revelations ever made in morphology and classification. The protonema

produced by the spores usually has a short life, in others its duration seems to be unlimited, as the apices go on growing and the oldest parts die, each branch becoming thus a separate bearer of plants. Mosses also multiply by detached buds, stolons, gemmae, and by the rhizoids becoming protonema. Some species, like *Funaria* and *Phascum*, persist perennially by means of their rhizoids. *Polytrichum aloides* and *nanum* produce gemmae from their rhizoids. Minute tuberous buds, having reserve food material, are developed on the root-hairs of *Barbula muralis*, *Funaria hygrometria*, and others, but these rhizoids have been observed by Schimper to produce leaf-buds without having recourse to a protonema, and in this way the male annual plants of *Dicranum undulatum* arise from the perennial clods of the female plants, and fertilize the latter. The leaves of several species of *Orthotrichum* produce protonema, which are club-shaped in *O. phyllanthum*; the same phenomenon occurs in some other mosses. In *Buxbaumia*—especially in *B. aphylla*—the marginal cells of the leaves produce a protonema which envelops both them and the stem with its filaments. *Oncophorus glauca* forms an interlaced mass of protonema on the summits of the plants when the reproductive organs are produced, and stop the further growth of the old plants. *Bryum annotinum* produces branch buds which fall off and reproduce the plant, and even the branches of some mosses detach themselves and set up an independent existence. Then there are the gemmae produced by *Tetraphis* and *Aulacomnion androgynum*, borne on a leafless elongation of the stem, and in *Tetraphis* elegantly surrounded by a cup of leaves. A detached leaf of *Funaria* has been known to produce a protonema when kept moist.

Articulated filaments, called paraphyses, surround the archegonia in the female flowers; in the male flowers they surround the antheridia, and are sometimes spathulate, consisting in the upper part of several rows of cells. The mature antheridia are stalked sacs, with a wall consisting of a single layer of cells containing chlorophyll, which assumes a red or yellow colour when ripe. In most mosses they are club-shaped, but in *Buxbaumia* and *Sphagnum* almost round. In *Sphagnaceæ* they open as in the hepaticæ, and in all others by a slit across the apex, through which the antherozoids are discharged in a thick mucilaginous jelly, still enclosed in their mother cells; the mucilage dissolves in water and the antherozoids escape and swim about. The mature archegonium consists of a large moderately long base, supporting a roundish ovoid ventral part, which supports a long thick neck often twisted on its axis. The wall of the ventral portion

consists of a double layer of cells before fertilization, and the neck consists of a single layer of cells of from four to six rows. They enclose together an axial row of cells, the lowest of which produces the oosphere from its protoplasm by rejuvenescence (that is—the formation of a cell from the whole of a protoplasm of an already existing cell) while the rest of the axial cells become mucilaginous prior to the fertilization of the oosphere, this mucilage bursts the four apical cells and allows the antherozoids access to the oosphere. From the fertilized oosphere is produced the sporogonium, which in *Sphagnum* develops almost perfectly within the growing ventral portion of the archegonium, which is transformed into the calyptra. In all other mosses the calyptra is torn away at its base by the elongation of the sporogonium, usually long before the spore capsule is developed, and is raised up as a cap, except in *Archidium* and its allies. The wall of the capsule consists of several layers of cells having a distinct epidermis, sometimes with stomata. In the development of the sporogonium the oosphere is clothed with a cell wall, and divides by a slightly inclined wall; division continues both vertically and transversely, and a multicellular body results. The mother-cells of the spores become isolated, and divide into four in all parts of the capsule at once. The length of time required for the perfect development of the fruit varies from three to twelve months.

Mosses are divided naturally into four families: *Sphagnaceæ*, having one genus; *Andreæaceæ*, having a few genera; *Phascaceæ*, having a few genera; and *Bryaceæ* (the true moss), all the remaining genera.

The spores of the *Sphagnaceæ* in water produce a branched protonema, but on a solid substratum a flat pro-embryo, while the abundant protonema of the *Bryaceæ* is wanting, and they only produce rhizoids when young. The antheridia stand *by the side* of the leaves, and are never terminal, and have a roundish form and a long pedicel. The archegonia are at the blunt end of the female branch, and are like those of the mosses. The summit of the branch begins to develop after the formation of the sporogonium, and elevates the latter enclosed in the calyptra; this stalk is called a pseudopodium, and of course is quite different from a seta. The calyptra is ruptured irregularly, and the theca opens by detaching the upper part as a lid.

The *Andreæaceæ* are small, very leafy and much branched mosses, growing in a caespitose manner; their long apiculate theca is sup-

ported on a short leafless pseudopodium. The calyptra is raised by the theca as a pointed cap, the short seta remains buried in the vaginula. The theca opens by four longitudinal slits, which are closed in damp and open in dry weather.

The *Phascaceæ* are small mosses, their protonema lives until their spores ripen. The theca only opens by the decay of its wall. The internal differentiation of the theca in *Ephemerum* and *Phascum* corresponds to that of the *Bryaceæ*, but in *Archidium* an intercellular space is formed in the theca, running parallel to its lateral surface, separating the wall from the inner mass of tissue, as in the true mosses; but in these latter a layer of cells parallel to this intercellular space produces the spore-mother-cells, while in *Archidium* it is only a single cell laying in the inner tissue that becomes the primary mother-cell of all the spores. This cell swells and supplants the other cells, until it lies free in the hollow of the theca; it then divides into four cells, these each dividing into four spores.

In the *Bryaceæ* the sporogonium is always stalked, and the seta is generally long and cylindrical. The theca always opens by a lid or operculum, which is either simply and smoothly detached from the lower part of the theca, or an annulus composed of a layer of epidermal cells is thrown off by the swelling of the inner walls, and thus the operculum is separated. Around the margin of the theca is a peristome, except where gymnostomous. The theca is at first a solid homogeneous mass of tissue, then an intercellular space is formed by means of several layers of cells separating from the wall, but the wall remains attached to the top and bottom of the columella. Rows of cells containing chlorophyll stretch from the wall to the inner tissue, while the outer layer of the wall is developed into a cuticularised epidermis. The third or fourth layer of cells of the inner mass of tissue, which is separated from the annular air-cavity by two or three layers of cells forming the spore-sac, produces the mother-cells of the spores.

The formation of the peristome must now be considered. In those mosses not forming a peristome, the parenchyma of the inner face of the operculum is homogeneous and thin-walled, and dries up at the bottom of the lid of the ripe theca, and the operculum is essentially formed of the epidermis, or it is attached to the columella, and forms a thickening at its summit, projecting over the mouth of the theca, or else it forms a diaphragm over the mouth, as in *Hymenostomum*.

(To be continued.)

REVIEWS.

"WEST YORKSHIRE." * PARTS I. & II.

WE hail with pleasure the tardy appearance of this long promised volume, and though not yet complete it is a welcome instalment. The first 228 pages are devoted to the Geology of the District, by the pen of Mr. Davis, illustrated by a number of diagrammatic drawings of local sections, five geologically coloured plates of more general sections across the country in various directions, and a map (4 inches to the mile) exhibiting the area of the different formations and their relative positions. The remainder of the volume, which is of joint authorship, is devoted to Physical Geography, and Botanical Topography, illustrated by a map on the same scale as the geological one, coloured to show the divisions of the river drainage; these drainage areas are divided into ten, viz:—the Lune, Ribble, Mersey, Ure, Nidd, Wharfe, Aire, Calder, Don, and Trent. One chapter is devoted to each of these areas, which after giving the leading details of the physical geography, and remarks on the scenery of the district, contains a list of the principal and more remarkable plants and mosses found therein, and in many cases with critical remarks upon them. We regret to have to notice one or two inaccuracies in this portion of the work, as at p. 349 where the R. Ribourne is stated to run north-west instead of N.E.: again the "Ivy-leaved Bell-flower" is in some instances referred to as *Campanula*, and in others as *Wahlenbergia hederacea*: some varieties are printed as if they were species, e.g. p. 354 *Blindia trichodes*, instead of *B. acuta* var. β *trichodes*; *Cardamine amara* is certainly not indigenous in Storthes Hall Woods, and surely *Ceratodon purpureus* is too common a moss to merit special mention.

The geological portion is as complete and exhaustive as the space will allow, and is indeed a production worthy of its author, who has evidently spared no pains to render the subject as clear and comprehensive as possible. A most useful and interesting addition to it is, the 40 pages devoted to the bibliography on the geology and physical geography, commencing with A.D. 1674, arranged in years, and containing 491 references. We can cordially congratulate the authors on the production of their first volume, and trust that the second, which is to contain complete lists of the flowering plants, ferns, mosses, lichens, and fungi, will speedily follow, and that before this year closes we shall have that basis to work upon in botanical science which is so great a desideratum with us at present.

* By Jas. W. Davis, F.L.S., F.G.S., &c., and F. Arnold Lees, F.L.S., &c., with Maps and Plates. London: L. Reeve & Co., 1878.

"NATURAL HISTORY OF HASTINGS AND ST. LEONARDS."

THIS little work, which appears to be the joint production of several members of the Hastings and St. Leonards Philosophical and Historical Society, is confessedly only intended as a first provisional list, and includes the whole of the authentic information obtained up to the present time. It comprises lists without localities of the species of animals and plants found in the district, and it appears that some of what we call "neglected orders," are not neglected by this society, as the list includes the Polyzoa, Hymenoptera (170 species), Diptera (179), Hemiptera (55) Musci (97), Lichenes (102), Algæ (159), and Fungi (131). It is rather a pity that localities are not inserted, as this would materially have increased its usefulness, but still as it stands, it is a good basis from which any naturalist in the district may make his starting point for further observations. Such works as these are always useful, and we earnestly wish that every county in the Kingdom would undertake to publish a similar list as a working basis, or where they have already got such a one, would supplement it by works like Baker's North Yorkshire, or Davis and Lees' West Yorkshire.

Short Notes and Queries.

Μυστῶν ἀδναῶν ἐθνεα πολλὰ.—On the evening of June 26th—a calm, quiet evening after a succession of scorching hot days—when returning homewards through Temple Hirst, near Selby, I was struck by a remarkable appearance. Every tree as far as the eye could reach was surmounted with one or more narrow vertical wavy wreaths of what appeared to be black smoke. Some of the thickest could be seen fully a mile away. On a nearer approach, each of these clouds was seen to be composed of myriads of gnats, and the whole air was filled with a humming noise like that of a swarm of bees. The gnats were no doubt developed in these enormous numbers under the influence of the intense heat in the filthy black water of the Aire, which runs past Temple Hirst, but what is the cause of their partiality for the tree-tops? Even the hedges had long narrow lines of gnats hovering above them. As the sun set, the clouds of gnats melted away and rapidly disappeared.—H. FRANKLIN PARSONS.

NOTES ON NATURAL HISTORY.—The exhibition of Natural History has so much occupied the time of members, that there is little out-door observation to record. In a walk by Cawthorne to Denby Dale on the 15th I only heard the songs of the yellow bunting, titlark, skylark, whitethroat, bluecap, lesser redpole, and green linnet, and the call-notes of the whinchat and grey linnet. Swallows and martins were numerous in their favourite haunts, although in some places they are reported to be scarce. Sand martins, spotted flycatcher and young, were seen about the quarries at Monk Bretton.—T. LISTER.

ARRIVAL OF SPRING MIGRANTS.—Subjoined is a list of dates of the arrival of our spring migrants, as observed principally by myself in this district during the present year :—Pied wagtail Feb. 24th, wheatear April 6th, willow warbler 14th, ring-ousel 14th,* redstart 17th, sand martin (several) 18th,* swallow 18th, tree pipit 19th, yellow wagtail 21st, cuckoo 22nd, whitethroat 24th, yellowhammer 27th, blackcap 28th, whinchat 28th, house martin May 1st, swift 4th,* spotted flycatcher 5th, fieldfares (last seen) 8th, nightjar 12th, garden warbler 19th.* An asterisk is placed against the species of which I am doubtful as to whether the date may indicate the earliest arrival. It is evident that a record of dates, based upon casual observations of the first appearance of the migratory birds, can be of little or no value. For instance, we very seldom see the swift in this locality before the middle of June (its nearest breeding haunts being Bingley), but this date affords a very fallacious indication of its arrival. The same remark applies to the ring ouzel: their various breeding haunts should be frequently, at least daily visited. It is also a common mistake to suppose that they announce their presence by their song immediately on arriving. If the weather be cold, and food insufficient, many species continue for a considerable time remarkably reticent—some even withdrawing altogether, as the house martins in 1877. Of course this district being somewhat elevated, they do not, as might be reasonably expected, make their appearance so early as in the low-lying districts. This is especially the case with the exclusively insectivorous species.—E. P. P. BUTTERFIELD.

Gonepteryx rhamni AT ARMITAGE BRIDGE.—*G. rhamni* was in my garden this morning. Had a long chase with my hat, but could not capture it. I was close to it several times.—G. C. B. M., Armitage Bridge, July 17th.—[This insect, although common enough in most places, has only been recorded three or four times previously in this district.—*Eds. Nat.*]

Lithosia stramineola IN NORTH LINCOLN.—I had to-day the pleasure of finding two examples of the above, *in copula* on grass, under some fine oaks at Willingham Park, near Market Rasen. The female has since deposited eggs. This is the first record of the occurrence of this not-common "Footman" in Lincolnshire, I believe, and as such is worth a passing notice.—F. A. LEES, July 12th.

BEETLES.—Will any coleopterist inform me whether the following beetles have ever been recorded or captured in the West-Riding or any other part of Yorkshire :—*Copris lunaris*, Lin., *Hydrous piceus*, Lin., and *Chrysomela fulgida*, Lin.?—E. B. WRIGGLESWORTH, Wakefield.—[I used to take *Hydrous piceus* in a pond near here many years ago for my aquarium. The pond has been cleared out since then.—C. P. H.]

Carduus eriophorus.—In your report of the Brough meeting the above is mentioned as being recorded for East-Riding for the first time. If this

be so, to what plant does the record in Baines's Flora refer? There *C. eriophorus* is given as occurring "Market Weighton to Londesbro."—G. WEBSTER, Holgate, 12th July.

A NEW WEST-RIDING SEDGE.—*Carex capillaris*, a pretty little sedge, until now has been known in but twelve British counties. To these Mr. William West has added a thirteenth, by his discovery of it in Gordale. It grows on the mural scar, at an altitude of about 1000 feet, on the left hand as the gorge is ascended, above the *débris* at the base of the cliff, but a little below the narrow plain forming the summit. It would appear to be very local, as I have been at the very spot indicated several times and never noticed it. This addition of *Carex capillaris* to the West-Riding flora is interesting in many ways. In Upper Teesdale it occurs with *Helianthemum canum* and *Potentilla alpestris*, *Dryas octopetala* and *Kobresia caricina*. We now know all these, except the last named, in the Craven district. Who will be the lucky finder of the *Kobresia* on the Malham, Sedbergh, or Cam Fell moors? It is very likely to occur. Formerly only the *Dryas* was known in Craven, next the *Potentilla*, next the *Cistus*, and now the *Carex*, have been discovered, leaving only the *Kobresia* to make the geographical alliance as complete in West Yorkshire as in Teesdale. I am glad to say that Mr. West's discovery comes in time for inclusion in the West-Riding flora which will form Vol. II. of the work on "West Yorkshire," of which the first volume has just been issued.—F. ARNOLD LEES, F.L.S.

ANOTHER MOSS NEW TO YORKSHIRE.—The West-Riding must take rank as possessing the richest moss flora of any tract of equal area in Great Britain. I have just received specimens, from the acute bryologists who have made the discovery, of *Seligeria tristicha*, Brid., from near Litton in Arncliffe-dale, near Wharfedale-head. This pretty little moss was collected by Messrs. S. Ashton and J. Whitehead, off dripping scar-limestone rocks, in June last, in the locality specified. The moss is not only new to Yorkshire but to England as well, the only stations hitherto known for it being in the Blair Athole district of the Scottish Highlands. It is a sub-montane species, like most of its genus; and xerophilous—dry-loving, *i.e.* limestone preferring—in its rôle of dispersion. Its discovery in our area brings up the number of West-Riding mosses to 330, out of the 569 so far known for all Great Britain. The last species, previous to this *Seligeria*, added to our moss flora was *Polytrichum strictum*, Banks, found on Ingleborough slope by Mr. Wm. West, of Bradford. As his modesty has apparently kept him from sending a notice of his discovery to your journal himself, I may as well place "the find" on record for him. Mr. Boswell has certified to the name.—F. ARNOLD LEES, F.L.S., July 18th.

CORRECTION.—In your report of the delightful excursion and interesting meeting held at Brough on Whit Monday, will you permit me to rectify a mistake relative to the name of an insect? When I consider that the

error originated through my neglect, it is only just for me to explain that I find the beetle named *Blaps semilis* ought to have been *Cychrus rostratus*, Linn. *C. rostratus*, though said by some writers to be common, does not appear to be so in Yorkshire; it has never been taken in the rambles of the Yorkshire Union before; and in only one other place—viz., Middlestown—have I discovered the species.—E. B. WRIGGLESWORTH. Wakefield.

Rainfall for June.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·67	10	14·60	* 14·57	4	0·67
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	†	...	...	...	...	...
HALIFAX... (F. G. S. Rawson)	360	3·25	9	20·88	27·60	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	2·09	9	13·80	16·18	11	0·67
BARNLEY ... (T. Lister) ...	350	2·13	12	10·82	17·59	11	0·50
INGBIRCHWORTH (do.)	853	4·23	14	17·14	22·20	10	0·85
WENTWORTH CASTLE (do.)...	520	2·72	13	11·35	19·37	...	...
GOOLE ... (H. F. Parsons) ...	25	2·78	13	9·02	11·45	11	0·65

* This is the average to date for 12 years, 1866-77. † No Returns.

Reports of Societies.

BARNLEY NATURALISTS' SOCIETY.—Meeting June 18th.—The president, Mr. T. Lister, gave a paper on birds at this season. The song-birds which at the end of last month reached their full perfection of melody, continued to enliven our woods and fields in the midst of June. Chief among these we have enjoyed the song of the prince of our woodland minstrels, the nightingale. We had the pleasure of hearing him in broad day, amongst twenty of our spring and resident songsters. They will now be much engaged in breeding and caring for their young. If we go to the quiet valley streams and sedgy pools, we may see the bright kingfisher, the moor-hen and coot, and sometimes catch a glance at their young on the margin of the pool or sedgy stream on the hills; westward by Ingbirchworth reservoir, we may see the wild duck and young, the sand-piper, the mountain linnet, brambling, siskin, and higher still, the screaming curlew, &c.

BRADFORD NATURALISTS' SOCIETY.—Meeting June 25th, the president in the chair.—Mr. B. Spencer gave an excellent account of a botanical ramble in N. Wales, where he collected over 60 species of rare plants, amongst which were *Helianthemum canum*, *Asplenium marinum*, *Spergularia marginata*, *Geranium prostratum*, and *Dianthus plumarius*. The president then gave an interesting account of a ramble in Huntingdonshire, after which he distributed a case of insects, containing *Colias Edusa*, *Gonopteryx rhamni*, *Vanessa polychloros*, and *Thecla quercus*; he also showed *Ophrys apifera*. Messrs. Illingworth and Firth described recent rambles at Thoin Moor and Wakefield.

MEETING July 9th, the president in the chair.—Mr. Saville read his Natural History Diary for the past six months, which proved extremely interesting and instructive. Mr. Illingworth showed a barn owl from Kendal; Mr. Firth, *E. affinitata*, *E. palumbaria*, *T. fimbria*, and *Cilia spinula*, new to the district; Mr. Suthers, *E. venosata* also new to the district; Mr. West, *Carex capillaris*, *C. pulicaris*, *Viola lutea*, *V. amœna*, *Kaleria cristata*, *Eriphorum latifolium*, *Galium sylvestre*, *Asplenium viride*, *Blysmus compressus*, *Polemonium cœruleum*, *Thalictrum montanum*, *Cochlearia alpina*, *Hypericum montanum*, *Rubus saxatilis*, and *Ribes petrœa* from Malham; *Vaccinium Oxycoccus* from Rombald's Moor; *Saxifraga hypnoides*, *Ribes alpinum*, *Poa nemoralis*, *Silene nutans*, *Polypodium Robertianum*, *Saxifraga granulata*, *Rhamnus catharticus*, *Helleborus viridis*, *Avena pubescens*, *Rubus Chamœmorus*, and *Carex curta* from near Buxton. Amongst the shells shown were *Dreisena polymorpha* and *Helix fulva*, from Skipton.—WM. WEST, Sec.

CHICHESTER AND WEST SUSSEX NATURAL HISTORY, &c., SOCIETY.—Monthly meeting, 11th June, the president in the chair.—Rev. E. A. Fuller read an interesting paper on the Gyr-Falcon. This bird is essentially a member of an arctic or sub-arctic fauna, its real home being in the coldest regions of the far north, as Greenland or Iceland. In olden times it had on several occasions been found in Shetland and the Orkneys, and very rarely in England or Ireland. The lecturer's attention having been recently called to one of the Museum specimens, he had been led to discover the confusion surrounding its nomenclature—some authors giving but one species, some two, some three, and the latest four. He then described the history of various discoveries of the bird or birds, and noted the four species recently described in Brit. Mus. Cat., viz :—*Hierofalco candicans*, Greenland and North America; *H. Islandus*, Iceland, N W Europe and Britain; *H. Holboelli*, Greenland only; and *H. Gyrfalco*, N Europe, Asia, and N America.

GOOLE SCIENTIFIC SOCIETY.—Excursion July 13th, to Holme-on-Spalding Moor. The party drove by road *via* Howden. The country between Howden and Holme is a flat tract of barren clay land, presenting few features of interest; but around Holme the clay is covered with a

deep yellow alluvial sand. Holme Church stands on the summit of an isolated hill 150 feet high, which is composed of the new red, or Keuper marls, capped with a bed of gravel which consists entirely of rolled fragments of carboniferous sandstone and grit, local rocks being absent. At the base of the hill, on a low ridge stretching away eastwards, is a pit in which the gravel, unlike that on the summit of the hill, is largely made up of the indurated green marls of the Keuper. It is strongly current-bedded, the beds dipping at a high angle to the south. East of Holme, near the Market Weighton canal, are some extensive woods of Scotch fir (native ?) growing on a heathy surface of wet alluvial sand. In these woods mosses and lichens grow in a luxuriance rarely attained, as mentioned in a note in the *Naturalist* for June, 1878. The best finds of the day were *Hypnum Schreberi* (in fruit), and *Cetraria Islandica*, usually an arctic and alpine lichen, but found by Dr. Lees in Lincolnshire, in situations similar to the present (*Naturalist*, Feb., 1878). The timber in Holme Park is very fine, and the trunks are draped with mosses and lichens in a way which we do not see in the West Riding. The flora of Holme, though yielding no very great rarities, is rich in species, owing to the variety of soil and situation. Upwards of 220 flowering plants were observed during the day, including *Sisymbrium Sophia*, *Salvia Verbenaca*, *Linaria minor*, and *Viburnum Lantana* (in plantations). There are in the neighbourhood of Holme, some remains of ancient ironworks and of a Roman pottery, from which fragments of earthenware, and of old slag, were obtained by some of the party.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting 12th July, Mr. G. T. Porritt, president, in the chair.—Mr. C. P. Hobkirk exhibited *Uromyces intrusa* on *Alchemilla vulgaris*, from Saddleworth district; the president *Coleophora vibricilla* and *Pteraphorus rhododactylus*, found by himself at Chattenden, in Kent, in June; Mr. S. L. Mosley, a fine mottled variety of *Satyris Janira* and *S. hyperanthus*, in which the spots on the upper side of the wings were more than usually distinct, both bred from Hartlepool. Mr. Conacher announced that on a more careful examination of the shells exhibited at the previous meeting as *Limax tenellus*, he found that some of the specimens given under the above name were really *Arion flavus*, a still rarer species, and that the locality was Ayrshire, and not Forfarshire, as recorded. Mr. Geo. Brook *ter.* showed under the microscope living specimens of *Cyclops quadricornis* and young, *Alcyonella fungosa*, and a large colony of *Vorticellæ*, also the following plants from Waterville, County Kerry:—*Habenaria viridis*, *Comarum palustre*, *Eriophorum vaginatum*, *Cotyledon umbilicus*, &c. Mr. Herbert Goss, F.L.S., &c., presented to the Club a copy of his "Insect Fauna of the Tertiary Period," for which a unanimous vote of thanks was passed. Rev. G. C. B. Madden read a most interesting and practical paper on "Bees, and Bee-keeping," illustrated with various examples of apparatus, and detailed the habits of the insects as observed by himself, and his own experience

of the beneficial results of the frame-hive as against the ordinary straw-hive.

HIDDERSFIELD NATURALISTS' SOCIETY.—Meeting June 24th, the president, Mr. Nettleton, in the chair.—Mr. John Bartlam named the botanical specimens—about 20—exhibited by himself and Messrs. Mackenzie and Nettleton. Mr. Godfrey exhibited a number of interesting geological specimens from the middle and upper lias of Lincolnshire, and from the Isle of Sheppy; Mr. Bould, the following fossils collected during the past week, and named by Mr. J. Tindall and the Rev. G. Bailey, from the chalk and Speeton clay of Bridlington and neighbourhood, viz :—*Chenenulopora convoluta*, *Inoceramus Brongniartii*, and *I. sulcatus*; *Belemnites mucronatus*, *Coscinopora pileolus*, *Terebratula semiglobosa*, *Scyphia terebrata*, and *S. librosa*; *Syphonia terebrata*, *Micraster cor-anguinum*, *Spatangus hemisphericus*, *Hippalimus*, *Gryphæa incurva*, *Marsupites ornatus*, *Rhynchonella octoplicata*, *Spongia spinosa*, *S. osculifera*, *S. terebrata*, *S. capitata*, and *S. radiciiformis*: also specimens of red jasper, agate, chalk conglomerate, flint with onyx, water worn pebbles composed of corals, fragment of sponge showing internal structure, head of *Spongia capitata*, a flint implement, and a number of other fossils and rock specimens, forming a most interesting series. Mr. Mackenzie read a paper on “The Commercial Uses of Lichens,” illustrating his remarks with specimens, and exhibiting crystals of a colouring matter obtained by himself from the common yellow lichen.—C. H. BOULD, Hon. Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting 24th June, at Liverpool, Mr. Robert Brown in the chair.—An interesting paper was read by Mr. S. L. Mosley on “Exotic Butterflies,” which he illustrated by numerous beautifully executed hand paintings. The usual conversazione then followed, and several exhibits were made, amongst which was a very peculiar spider from Demerara, by Mr. T. J. Moore.—W. H. MOUNTFIELD, Sec.

LIVERSEDGE NATURALISTS' SOCIETY.—Monthly meeting July 2nd, the Rev. W. Fowler in the chair.—Mr. Crossland exhibited the coal fossils *Lepidodendron Harcourtii* and *Calamites cannaeformis*; Mr. Wilson various lepidoptera taken at and about Liversedge this year, including a black variety of *Betularia*. The president laid on the table the following plants from the neighbourhood of Haxey, in the Isle of Axholme :—*Anthyllis vulneraria* and *Chlora perfoliata* (usually limestone plants), *Scleranthus annuus*, *Salix pentandra*, *Pinguicula vulgaris*, *Drosera rotundifolia*, *Cladium Mariscus*, *Habenaria bifolia*, *Orchis incarnata*, *Oenanthe Phellandrium*, *Carduus pratensis*, *Equisetum polystachion*, *Polytrichum piliferum*, and *P. juniperum*.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting 22nd June, Mr. C. Sheard, v.p., in the chair.—A great number of botanical specimens

were laid on the table, amongst them being *Trientalis europæa* (a very rare plant), *Pinguicula vulgaris*, *Echinum vulgare*, *Ophioglossum vulgatum*, *Hypochaeris glabra*, *Geranium dissectum*, *Sanicula europæa*, *Viola lactea*, *Polypodium Dryopteris*. Mr. T. Hirst exhibited a number of birds, amongst them being one pair of hobby hawks, the kittiwake gull, Norfolk plover, a white starling, and a dun-coloured starling shot on Illingworth Moor.—J. OGDEN, Sec.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting at Burrwood, on 1st July, Mr. J. Edwards in the chair.—The following eggs were exhibited by Mr. B. Garside :—Lapwing, pheasant, swallow, and tree pitpit.—W. H. STOTT.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting July 4th, Mr. J. Wilcock, v.p., in the chair.—The exhibits were not many. The chairman read a paper on the "British Conchiferous Mollusks," which was the first of a series he purposes reading. After a brief analytical enumeration of several families, he proceeded to give some idea of their conformity, life histories, physiological and anatomical structure, modes of reproduction, fecundity, development, modes of attack and defence, renewal of parts, perforating power, tenacity of life, their uses and injuries to man, and their distinguishing individual characteristics—all of which will be fully dealt with in the course of papers intended to be delivered. The descriptions were rendered clearer by the exhibition of specimens.—J. W. SHAW, Corr. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, June 13th, Mr. Ward in the chair.—Mr. Sharp exhibited a specimen, young in down, of the great crested grebe, *Podiceps cristatus*, also a young example of the storm petrel, *Thalassidroma pelagica*; Mr. Bacon, a grand specimen of eggs of the Sandwich tern, *Sterna cantiaca*; Mr. M. Smith, the oil beetle, *Melo violaceus*; Mr. Helstrip, a fine variety of the starling, *Sturnus vulgaris*, shot at Kirkbymoorside; Mr. G. C. Dennis, a fine series of *Euchelia Jacobæ*, bred from larvæ taken at Sherwood Forest; also a very large ichneumon, bred from the pupa of *Smerinthus ocellatus*; the hon. secretary, Mr. Prest, the larvæ of seven species of moths taken by himself this year, and kindly preserved and mounted on their proper food-plants by Lord Walsingham in a very life-like manner; also a fine series of *Melanthia albicillata*, taken at Bishop's Wood.

MEETING July 10th, Mr. W. Chapman, v.p., in the chair.—Mr. G. Bacon exhibited a fine example of the spider crab, taken on the Dogger Bank; Mr. Helstrip, the eggs of the grasshopper warbler, *Sylvia locustella*, taken near Selby; the secretary, Mr. Prest, a case of preserved larvæ on their food plants; amongst them were *Epione vespertaria*, only taken near York, *Tephrosia biundularia*, *Ellopiæ fasciaria*, and *Eupithecia abbreviata*, all splendidly mounted by Lord Walsingham.

Diary.—Meetings of Societies.

- Aug. 3. Cambridge Entomological Society.—Excursion to Wicker Fen.
" 5. BANK HOLIDAY.—Yorkshire Naturalists' Union—Excursion to Hambleton, for Bishop's Wood. Tea at Red Lion Hotel, at 3 p.m.; Sections at 4 p.m., and General Meeting at 5 p.m., at the National School. Local Secretary, Mr. Wm. Prest, 13, Holgate Road, York.
" 6. Liversedge Naturalists'.
" 6. Bishop Auckland Naturalists' Club.
" 9. Huddersfield Scientific Club.
" 10. Cambridge Entomological Society.—Excursion to Devil's Ditch.
" 14. York and District Naturalists' Field Club.
" 17. Cambridge Entomological Society.—Excursion to Brandon.
" 22. North Staffordshire Naturalists' Field Club—Excursion to Weever Hills, in conjunction with the Manchester Club.
" 26. Lancashire and Cheshire Entomological Society.

BOOKS, &c., RECEIVED.—*Midland Naturalist* (July), *American Journal of Microscopy* (June), *Science Gossip* (July).

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SEPTEMBER, 1878.

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Original Articles.

ON MOSSES.*—(Concluded.)

BY WM. WEST.

Tetraphis is the link that binds the last to those having a peristome, and here the firm epidermis of the upper part of the theca falls off as a lid, the whole internal tissue of the latter splitting across into four valves, the origin and structure of which are very different from a peristome; for, except in *Polytrichaceæ*, neither the teeth nor the cilia consist of cellular tissue, but of thickened and hardened parts of the walls of a layer of cells, which is separated by layers of thin-walled cells from the epidermis which forms the lid. These latter layers, as well as the delicate parts of the former, disappear, while the thickened parts of the wall remain after the lid is cast off. When the peristome is double, the outer row is said to be composed of teeth, the inner of cilia. There is a row of epidermal cells, thickened on the outside; these cells are modified in shape where the annulus is formed, several layers of cells come next, and inside these is the layer of cells situated over the air-cavity from which the peristome is formed. Near the base of this layer are some thickened cells, which serve to unite the edge of the theca with the base of the teeth. The outer face of the layer of cells from which the peristome is formed, is thickened, and it forms the teeth; the cilia are formed from the thickened axial face of the same layer of cells; where and when this inner face does not thicken, there are no cilia formed. The most highly developed mosses belong to *Polytrichum*, whose theca differs in structure from the other genera. The teeth of the peristome are composed of bundles of thickened prosenchymatous cells, having the shape of a horse-shoe, the branches of two adjoining bundles form together one of the teeth. There is also a layer of cells uniting the points of the teeth after the lid is cast off. The spore-sac in some species (as in *Polytrichum piliferum*) is separated by an air cavity from the columella, which is penetrated like the outer air cavity, by conferva-like rows of cells. The seta is swollen at its junction with the theca, in some species, forming an apophysis.

Mosses are subject to varieties as well as phænogamous plants, and some varieties of one species sometimes differ from each other more than neighbouring species which are admitted as distinct. *Hypnum cupressiforme* is an example. The peristome is sometimes present and sometimes absent in some species, as in *Encaplypta vulgaris*, hence the distinction of species is sometimes difficult.

The habitats of mosses are very varied, for while some species will grow either on the ground, on the trunk of a tree, or on a rock, others will grow only in certain situations—some preferring fallow fields, some only in calcareous soil, some at great elevations, others on dung, or within the influence of salt-water spray, on rich moist banks, dripping rocks, peaty heaths, in spongy bogs, or on naked clay.

Some mosses are almost cosmopolitan, as *Bryum argenteum*, *Funaria hygrometrica*, *Polytrichum commune*, *Ceratodon purpureus*, and others. There are very few British mosses which have not been also observed on the continent of Europe, while Schimper enumerates 280 continental species not found in Britain. Out of 249 species recorded in Hooker's "Flora of New Zealand," 41 are British or European. A few ancient mosses have been found preserved in amber.

Mosses seem to be of very little use. *Sphagnum*, when ground, is used as a food by man in cold climates, it is also one kind of the reindeer's food. The Esquimaux use one species as a lamp-wick, and peat, which is used as a fuel, is mostly composed of the remains of mosses. In the trackless forests of America they are useful as a compass to the traveller, for by their presence on the north side of the trunks of trees, he can always tell which way to proceed. In a dried state they are extensively used for packing. They also afford lodgment and food to many insects, and if it were not for them, some tracts of land would probably remain barren, as they gather amongst their matted branches the fleeting particles of soil, and thus prepare the way for a higher order of plants.

Mosses can be easily cultivated in a small conservatory or fern-case.

With regard to collecting and preserving mosses there is no difficulty, for if you expose them to the air of an ordinary room they will dry, and if soaked in water whenever wanted for examination, they can then be examined as well as when freshly collected. Portions are usually pressed flat and mounted on paper for the herbarium; but I have found Dr. Wesley's plan to be the most convenient for herbarium purposes, that is—to place each species of moss in a paper bag, which is numbered according to the London catalogue at one corner, and all the other particulars necessary written on the bag; the bags are kept in a box in such a manner that the corners can be turned down to look for any number wanted, which can be found, examined, and replaced with facility.

With regard to the minute systematic arrangement of mosses the text-book must be consulted (of which the three relating to British mosses are on the table): the characters are obtained from the fruit,

the peristome, the calyptra, the vaginula, and similar parts, as well as the position of the fruit; other minor characters serve for specific distinction, as the shape, nervation, serration, and insertion of the leaves.

I have had to leave unsaid much that I had intended to say, and have probably in some instances re-stated things, but my object will have been accomplished if I have succeeded in interesting any one in this neglected order of plants; for we are situated in the midst of a rich neighbourhood, as 314 out of 570 British species are found in the West-Riding. I forgot to mention before that 1250 species of mosses were known in 1870, and 700 species of *Hepaticæ*; I have recently enquired of an eminent bryologist as to what is the present number on record, but he was unable to inform me. Here is a large and interesting order of plants comparatively neglected; let me hope that my remarks may lead some of you to undertake the study of the humble mosses, for they charm the eye of the artist by their grace and loveliness whenever observed: and though observation with regard to them is the exception rather than the rule, they help by their varied tints the adornment of every landscape from the coast to the line of perpetual snow.

FLOWERLESS PLANTS, AND THEIR HABITATS.*

BY H. FRANKLIN PARSONS, M.D., F.G.S.

THE term "flowerless plants," though useful is not strictly accurate, and must be taken to signify not that organs fulfilling the office of flowers do not exist in the plants so-called, but that these organs, when present, are formed on a different pattern from those of flowering plants proper. The flowers of the higher plants, as I may remind you, consist essentially of two sets of organs, stamens and pistils, sometimes combined in the same flower, sometimes found only in separate flowers, or even on different plants. Together with these there are usually certain whorls of modified leaves, the calyx and corolla, often conspicuous in form, colour, and odour, in order to attract insects. The stamens bear at the end a knob, or "anther," containing a yellow powder, the "pollen," which is the fertilizing agent. The pistil contains one or more ovules, or rudimentary seeds, enclosed in a case, the "ovary," (or in the coniferæ naked); the ovary being tipped with a sticky knob, the stigma. When the pollen falls upon the stigma it adheres, and emits fine tubes, which push their

* Read before the Goole Scientific Society.

way to the ovules and enter them through a minute hole at their apex, and thus fertilize them. From the union of the pollen tubes with certain cells in the ovule, the young plant takes its rise. The fertilized ovules develop into seeds, each of which contains an embryo or young plant ready formed. When the seed germinates, the young plant bursts the seed coats and pushes forth root, stem, and leaves, the seed itself decaying.

In the so-called flowerless plants, the parts corresponding to the flowers, when present, are minute inconspicuous organs, called antheridia and archegonia, quite unlike stamens and pistils; hence these plants are called by botanists Cryptogamia—*i.e.* plants with concealed organs of reproduction.

The antheridia are club-shaped organs made up of cells, each of which contains a minute filament, which when liberated by the bursting of the cell, swims freely with a wriggling movement; these filaments, which closely resemble what we meet with in the animal kingdom, are the fertilizing particles. The archegonia are clusters of cells from which, when fertilised, the young plant or the spores are developed. The process of reproduction is, however, so different in different orders of flowerless plants, that no general description can be given; in very many cases we find two or even more methods of propagation in the same plant, and in a large number of species the true sexual reproduction is very rare, or altogether unknown. In the higher orders of cryptogams the remarkable phenomenon of "alternation of generations" is met with analogous to what is found in some animals, as the aphides, described by Mr. Hunter in his paper; the life history of the plant presents two stages—a nutritive non-sexual stage, and a reproductive sexual stage. The germs of the cryptogams are "spores," not "seeds," the difference being that the "seed" contains the young plant, the "spore" becomes the young plant. Among the cryptogams we meet with a far greater diversity of form and function than among the higher plants, and many of the lower forms present phenomena of movement, and processes of nutrition, very like those of lowly organised animals. Indeed the two great kingdoms of animals and plants, so widely divergent as regards their higher members, approach each other so closely below, that it is very difficult to draw the line between them, and there are several groups (as the sponges among animals, and the diatoms and volvocinæ among plants) which form a sort of debateable ground the possession of which was disputed by botanists and zoologists for years before they were finally ceded to one or the other. A similar

difficulty is met with in defining the limits of the several orders : a lichen, a fungus, and a seaweed look very distinct, but intermediate forms are found connecting them so closely that it is difficult to say where one order ends and another begins.

The cryptogams are classified into two divisions—the acrogens, which have a distinct stem and leaves, and the thallogens, which consist of a frond without any distinction between stem and leaves. Here again we find how hard it is to bind Nature by one rule of classification, for some of the liverworts have not only distinct leaves but stipules, while others which resemble them so closely in other respects that they cannot be removed from them, have a flat green frond without stem or leaves. On the other hand, the genus *Delesseria* among the red seaweeds has beautifully formed leaves with stalks and veins, though consisting only of cellular tissue.

The Acrogens are divided into two groups, according as they contain vessels and woody fibre, or are composed wholly of cellular tissue. The vascular Acrogens comprise the ferns and three or four smaller orders, apparently of little consequence at the present day, but which have played a highly important part in the history of our globe, as containing the plants of which the carbonized remains form our beds of coal, and as being the road by which, if the theory of evolution be true, the vegetable world was developed in its upward progress through the coniferæ into the flowering plants. Time will not allow me to do more than glance briefly at the characters of the several orders. Ferns have a stem which in our British species is either a short rootstock or a creeping underground rhizome, but which in many fossil and exotic kinds forms a tall erect trunk, and in some others has a climbing habit. The leaves are large, generally much and elegantly divided, and coiled spirally when young. The fructification is borne at the back of the leaves, or on certain modified leaves ; it consists of clusters of spore cases often covered at first with a transparent membrane. The spore cases in most of our British species burst by means of an elastic ring round the margin, and scatter the spores. This is the non-sexual stage of the plant. The spores develop, not into a fern-plant like that from which they spring, but into a small green heart-shaped frond like a liverwort, called the prothallus ; this frond bears antheridia and arche-gonia, from the union of which the young fern springs. Thus, while the non-sexual stage may be a lofty tree, enduring for a century, the sexual stage is no bigger than one's finger-nail, and perishes in a few weeks. In certain annual species, however, the prothallus is more

persistent, so that the duration of the two generations is more nearly equal.

The order of the horsetails, Equisetaceæ, now contains but a single genus, Equisetum, not large, but of nearly world-wide distribution; the order is also of high antiquity, and of great importance to the geologist, since it includes the gigantic and well-known plants of the coal measures, Sigillaria, Calamites, &c. The horsetails have erect, hollow-jointed stems, bearing toothed sheaths, and whorls of branches. The fructification consists of capsules borne on the under surface of umbrella-shaped scales, which are clustered together into a cone at the end of the stems. The spores bear four long elastic arms, which are coiled tightly around them when moist, and unroll when dry : so that the spores when breathed on under the microscope, twist and writhe about in the most striking manner. The germination is similar to that of ferns.

The Marsiliaceæ contain but a single British species, the pillwort, a small creeping plant with grass-like leaves, but spirally coiled when young, like those of ferns. The fruit consists of brown capsules like peppercorns ; these are divided by partitions into four cells, each cell containing many membranous sacs. The sacs at the upper part of the cells contain many small spores, those at the bottom of the cell but a single large spore. The small spores contain moving filaments like those in the antheridia of ferns and mosses ; the large spores have a hole in the outer coat through which a portion of the inner coat protrudes and becomes developed into a prothallus, bearing archegonia, which are fertilized by the contents of the small spores.

The Lycopodiaceæ, or club-mosses, like the horsetails, are a small order, but found in all parts of the world, and are of great antiquity, as the huge Lepidodendron of the coal measures belonged to this order. Some are rigid and leafy, like miniature conifers ; others are more like mosses in habit, but may be readily distinguished by the leaves containing bundles of spiral vessels. The greenhouse plants which gardeners call mosses, are really club mosses—*Se laginella*. The fructification is entirely different from that of mosses, the spore cases are sessile in the axils of the leaves, and are of two kinds—one kind containing small and the other large spores. The germination is similar to that in the pillwort. In the genus *Lycopodium* only the small spores are met with.

(To be continued.)

Short Notes and Queries.

Carduus eriophorus.—I have to thank Mr. Webster for correcting my error as to this plant not having been recorded for South-East Yorkshire. It was scarcely likely that so conspicuous a plant should have escaped notice. I have not Baines's "Flora" by me; but it is not given in "Topographical Botany," nor mentioned specially for the East Riding in Baker's Supplement. In the south of England I have noticed the stems of this thistle to be commonly inhabited by a white grub, which eats the pith, and finally, having gone through the pupa stage, perforates the stalk (I do not know how), and emerges as a small slender-bodied moth with forewings, white spotted with black, ermine-fashion.—H. F. PARSONS. [*Halonota scutulana* feeds in thistle stems in the manner stated above, but the moth is brown with white blotch; it is common in the north of England as well as the south.—*Eds. Nat.*]

THE COMMON SCOTER.—On the 10th of August I shot a nice specimen of the common scoter (*Oidemia nigra*), a male bird, in the Ryburne valley; it was evidently an adult, and in very good plumage. This species is not common in this part of Yorkshire, though occasionally observed—one having been shot in this district a couple of years ago. Being such excellent divers, and able to swim a long distance under water, and seldom remaining many seconds on the surface when disturbed, makes them rather difficult to shoot. The bird is being preserved.—F. G. S. RAWSON, Thorpe, Halifax.

SPRING MIGRANTS.—In Mr. Butterfield's list of spring migrants I notice the yellow hammer and the pied wagtail. May I ask if these two birds are absent in winter in the district from which Mr. Butterfield writes? Both of them are constantly resident here (Lofthouse). The latter-mentioned is said to leave the inland parts of the country and to resort to the coast in winter, but I have observed them here in the fallows in all the winter months. May not the accession of wagtails on the coast in winter be from Norway or some other northern country?—GEORGE ROBERTS, Lofthouse, Wakefield.

STONECHAT.—Since my note on this bird in the March number, I have been anxiously looking for further information concerning its habits in the Huddersfield and Halifax districts. Mr. Varley contends that the stonechat is only an accidental visitor, and not a breeder. I notice that it is entered in Mr. Hobkirk's work (2nd ed.) as remaining all the year round; it therefore must breed, otherwise Mr. Hobkirk is wrong. It is not conceivable that a species should remain permanently in a district and not breed. In this instance we have two excellent observers residing in one and the same district giving us contradictory information. It is not with a view of re-opening a dispute, but rather to elicit further details respecting the economy of the bird, that I have recurred to the subject. If any readers of the *Naturalist* have made any observations during the past season, I hope they will favour us with an account of them; a little more light seems desirable.—GEORGE ROBERTS, Lofthouse, Wakefield.

RARE LEPIDOPTERA AT WICKEN FEN.—When at Wicken Fen last month, I had the pleasure of seeing three specimens of *Hydrilla palustris* in the local collector's boxes there. I ascertained that at least fifteen specimens of this rare species had been taken this season. I also saw long series of *Macrogaster arundinis*, *Meliana flammea*, and *Nascia ciliialis*; at least a hundred of each of these species must have been secured.—GEO. T. PORRITT, Highroyd House, Huddersfield, August 12th.

Amphydasis betularia (Black Var.)—On June 1st, whilst walking through Shipley Glen with some friends, my attention was called to two moths which were resting on the trunk of an oak tree. On looking at them I was surprised to find a pair of *A. betularia* (black var.). Here this variety seems to predominate, in fact very few indeed of the normal form are seen.—J. W. CARTER, Bradford, Aug. 17th. [Out of the only four specimens I observed in this district this season, three were of the black form.—G. T. P.]

Acronycta alni.—Mr. Wait Palmer having spent a few hours at Escrick Park, the seat of Lord Wenlock, on July 25th, saw a caterpillar feeding upon a lime tree, which he secured and brought home for me. You may be sure I was pleased to see it was a veritable *alni*.—THOMAS FOSTER, 6, Wren Lane, Selby, August 13th.

Acronycta alni IN SOUTH LINCOLNSHIRE.—On the 2nd of August, whilst botanising in Skegglethorpe Wood near Lincoln, with the Rev. W. Fowler, I was lucky enough to espy, feeding upon the upper side of the leaf of *Tilia parvifolia*—the small-leaved lime tree—a caterpillar that at once attracted admiration and attention by its unique appearance. Its dead-black velvety body, slashed across the back of each segment with a streak of lemon-yellow, each segment being adorned in addition by a pair of shining black bristles, enlarged and flattened at their free extremities like the ear-rests of a pair of old-fashioned spectacles, and unlike anything else in nature I ever saw, made a singular and beautiful picture against the full green of the lime leaf. This was the rare *A. alni*, as to the food-plant of which Mr. Newman, writing in 1869, remarks there is considerable doubt; although from its specific name it should eat alder (*Alnus*) in a state of nature. Mr. Newman, in his "History of British Moths," further states that the larva "does not exhibit any symptoms of uneasiness when handled;" but here he was certainly in error, if this example of *Alni* is not the veriest untamed member of his species, for a more savage larva, pugnacious and intolerant of touch, I never saw. The Rev. W. Fowler can bear me out in saying the slightest touch with the finger or a pencil of one of the hairs (which seem peculiarly sensitive), would cause the creature to curve sharply round laterally, and attempt to seize the cause of annoyance with the comparatively powerful jaws of its glossy black head. It is, moreover, a cannibal, for when I arrived at home I put it into a box with a couple of *A. megacephala* larvæ for the night;

next morning one of them was more than three-parts devoured, *Alni* being surprised, not "red-handed" exactly, but at rest full-length with jaws to the remnant of his victim. Since, "solitary confinement" being the sentence passed upon him [tender-hearted entomologists don't believe in capital punishment], *Alni* has sparingly indulged in leaves of the common lime (*T. Europæa*), which he does not seem to relish so well as the scraps of *T. parvifolia* I brought back from Skegglethorpe. *A. alni* has not before, I believe, been recorded for Lincolnshire; which fact, together with the above new passage in its life-history (death-history for the *Megacephala*, 'spite of its big head), is my excuse for this perhaps prolix communication. But I often wish the *Naturalist* contained more entomology. Entomologists, however, prefer to "beat about the bushes" a good deal before they venture on quill-driving.—F. A. LEES.

Helix rotundata AT HESSLE.—Whilst shell-collecting at Hessle a few weeks back, I had the good fortune to take five specimens of *Helix rotundata*, var. *alba*.—J. D. BUTTERELL, Hull, July 28th.

Rainfall for July.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·03	6	15·63	* 17·38	24	0·52
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	·860	9	...	...	24	·340
HALIFAX...(F. G. S. Rawson)	360	1·37	8	22·25	31·35	23	...
BRADFORD...(J. A. Douglas, [F.M.S.]	415	1·17	6	14·97	17·28	24	0·92
BARNLEY ... (T. Lister) ...	350	1·04	9	11·86	19·83	24	0·32
INGBIRCHWORTH (do.)	853	1·23	13	18·37	25·53	27	0·50
WENTWORTH CASTLE (do.)...	520	0·99	9	12·34	21·94	27	0·52
GOOLE ... (H. F. Parsons) ...	25	1·43	9	10·45	13·42	24	0·62

* This is the average to date for 12 years, 1866-77. † No Returns.

Reports of Societies.

THE BRITISH ASSOCIATION for the advancement of Science: meeting at Dublin, opened on the 14th August, by the president's inaugural address. In section D, Biology, the president, Prof. W. H. Flower, F.R.S., gave a most interesting opening address on Natural History.

Taking advantage of this year being the centenary of the death of Linneus, he gave a general review of the progress of zoological knowledge since that epoch, and then taking Linneus's arrangement of the mammalia from the *Systema Naturæ*, of which he had a large diagram on the screen, he compared it with the various genera and species as at present understood, concluding with these words:—"Our knowledge of the living inhabitants of the earth has indeed changed since that time. Our views of their relations to the universe, to each other, and to ourselves, have undergone great revolutions. The knowledge of Linneus far surpassed that of any of his contemporaries; but yet of what we know now, he knew but an infinitesimal amount, and much that he thought he knew we now deem to be false." The address was followed by the report of the "Close Time" Committee, read by Rev. Canon Tristram; this report dealt chiefly with the statements published by Messrs. Buckland, Spencer Walpole, and Archibald Young, commissioners appointed by Government to report on the Scotch Herring Fisheries. He boldly refuted nearly every statement made in their report, and showed that in numerous clauses the conclusions arrived at by the Commission were exactly the reverse of what their own statements warranted. Instead of eleven hundred millions of herrings being destroyed annually by the gannets on these coasts, the report showed on almost incontestible evidence that the numbers destroyed by them could not exceed 350,350,000; and in the discussion which followed, in which Dr. Gwyn Jeffreys and others took part, it was shown that, instead of the herring being the chief or only food of the gannet as stated by the Royal Commission, it fed chiefly, though not entirely, on the coal-fish. Dr. Williamson also read a paper on "The so-called Radiolarians and Diatoms of the Coal measures," in which he produced evidence to show that these remains so-called by Dr. Carruthers could scarcely be referred to that family, but from their close resemblance in internal structure to certain resting spores and seed-cases of some of the Cryptogamia, were much more likely to belong to the latter class of organisms—indeed some of the diagrams of these forms were so striking that no one could doubt their affinity. This opinion was concurred in by Sir J. D. Hooker, Dr. Balfour, and Count Castracane.—[It is our intention, if space will allow, to give a further notice of these meetings in our next issue.—*Eds. Nat.*]

BARNSELY NATURALISTS' SOCIETY.—An exhibition in connection with this Society was held from the 2nd to the 8th of July, being opened by the Mayor of the town. It was very successful, and left a balance of £11 for the Society, which will be spent on books for the library.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 23rd, Mr. B. Spencer in the chair.—Messrs. Carter and Firth exhibited specimens of *V. cambricaria*, from Bingley, new to the district. Mr. Soppit sent *Phytometra aenea* from Southport; also the following plants:—*Salix repens*, var.

argentea, *Erythraea pulchella*, and *Trifolium fragiferum*. Mr. West shewed white *Orchis pyramidalis* from Ribblesdale; white-flowered *Solanum dulcamara*, *Claytonia alsinoides* from Bakewell.

MEETING, August 6th, Mr. Firth in the chair.—Mr. B. Spencer shewed a fine tuft of *Parnassia palustris* from Buxton; Mr. Firth, *Triphena janthina*, new to the district; Mr. S. Crowther, some good fossils from Ribblesdale; Mr. Andrews, *Honckeneya peploides*, *Eryngium maritimum*, white-flowered *Scabiosa arvensis*, double-flowered *Potentilla reptans*, &c., from Morecambe; Mr. West, *Sium latifolium*, *Ononis spinosa*, and *Allium Scorodoprasum* from Selby; *Hypericum elodes* and *Gentiana Pneumonanthe* from Riccall; *Ceanothe lachenalii*, *C. fistulosa*, *Sium angustifolium*, &c., from Hambleton.—WM. WEST, Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting August 3rd, Mr. J. French, v.p., in the chair.—The chairman exhibited a fine specimen of the stag's-horn fern, and one of *Humulus lupulus* (male), from a hop garden in Kent, and explained that though the female plant was so common, the male is very rare. Mr. John Shaw named a collection of about 80 plants exhibited by himself, from Askern, Mr. Mackenzie from Wales, and Mr. Bould from this district, including *Sonchus oleraceus*, *Achillea ptarmica*, *Cicuta virosa*, *Plantago coronopus*, *Campanula glomerata*, *Chlora perfoliata*, *Euphorbia exigua*, *Euphrasia Odontites*, *Brachypodium sylvaticum*, *B. pinnatum*, *Stachys sylvaticum*, *Asplenium septentrionale*, and *Polypodium cambricum*, the latter hitherto for some time believed to be extinct, but now re-discovered by Mr. Mackenzie to be growing in North Wales. Mr. Spiegel gave a lucid description of the finding of meteoric stones, some of them very minute, in mud dredged from the bottom of the ocean. Mr. Spiegel also named the following crystals, exhibited by Mr. Mackenzie, from Festiniog, North Wales, viz:—Quartz or berg crystal, white amythest and tinted ditto, and also kindly promised to obtain the names of the others, remarking that the study of mineralogy was, except by a few, very much neglected, and regretted that his own pursuits would not allow him time to take it up, as, from what he knew of it, it would repay anyone who would go thoroughly into it. Mr. Spiegel then delivered a lecture on "Fermentation," which was of great interest.—C. H. BOULD, Hon. Sec. [We would suggest to the secretary the propriety of referring plants, &c., to their proper districts in future reports, as by being mixed up in this manner they are very misleading.—*Eds. Nat.*]

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting August 9th, Mr. G. T. Porritt, president, in the chair.—The president showed living larvæ of *Papilio Machaon* and *Simyra venosa*; also a box of imagoes, including *Nonagria Hellmanni*, *Leucania phragmitidis*, *Meliana flammea*, *Ptilodontis palpina*, *Eudorea lineolalis*, *Hyria auroraria*, *Nascia ciliaris*, and *Tortrix dumetana*, with the exception of two species all taken by himself on a recent excursion to Wicken Fen. He also showed larva of *Euclidia*

glyphica, reared from eggs sent from Folkestone. Mr. S. L. Mosley, a curious dark variety of *Larentia didymata* he had bred; Mr. Jas. Varley, a case of bred *Cynthia cecropia*, *Bombyx polyphemus*, &c. Mr. George Brook, preserved larvæ of *Papilio Machaon*, *Vanessa Antiopa*, *V. cardui*, *V. Atalanta*, *V. Io*, *V. Polychloros*, and *Melitæa Artemis*; also the following botanical specimens:—*Chlora perfoliata* and *Orchis pyramidalis*, from Burwell, near Louth; and *Gymnadenea Conopsea*, *Scabiosa columbaria*, *Geraneum sanguineum*, and *Meconopsis cambrica*, found on the occasion of the Union excursion to Settle.

STAINLAND NATURALISTS' SOCIETY.—Meeting Aug. 5th, at Burrwood, Mr. C. C. Hanson in the chair.—Mr. B. Garside exhibited eggs of the sparrow hawk, Mr. J. Fielding a pair of live shell paroquets from Australia. A good collection of the local flora was put on the table by Mr. J. Edwards.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Aug. 1st, Mr. Spurling in the chair.—Mr. Sims exhibited *Zygæna minos*, *Hepialus sylvinus*, *Tanagra chærophyllata*, and others; Mr. Wilson *Aporophylla Australis*, *Xylomiges conspicillaris*, *Eupithecia lareciata*; Mr. Shaw, fossil shells from the Cleveland alum shale.—J. W. SHAW, Corr. Sec.—[We suspect the moth exhibited by Mr. Sims as *Zygæna minos* was *Z. nubi-gena*: it is very doubtful if the true *minos* has ever occurred in Britain.—*Eds. Nat.*]

YORKSHIRE NATURALISTS' UNION.—The fourth meeting for 1878 was held at Settle on Saturday, the 20th of July, the main object being to visit the famous Victoria Cave. About 120 members and visitors took part in the proceedings, which commenced at nine a.m. by an examination of the various remains preserved in the museum of the Giggleswick Grammar School, Mr. R. H. Tiddeman, M.A., F.G.S., secretary to the British Association Committee for the Settle Cave Exploration, acting as guide. This done, the various exploration parties were formed—one led by Dr. Willis, of Bradford, taking the west route to Feizor, and another led by Mr. W. Gomersall and Mr. R. H. Tiddeman taking the east route past Castleberg and Attermere Scars for the old calamine shafts (which produced numerous mineral specimens), while smaller groups and individuals dispersed in different directions. At two o'clock all re-assembled at the Victoria Cave, where Mr. Tiddeman delivered an address upon the work of exploration, not forgetting to remind the members that the work is now at a standstill for want of funds. Tea at the Mechanics' Hall and the Lion Hotel, Settle, having been despatched, and the sectional meetings concluded at the National Schools, the general meeting opened at six p.m. in the large National Schoolroom, the chair being occupied by Mr. Thomas Tate, president of the Geological Section. The roll being called, 15 societies were found to be represented. The list of new subscribers included the Duke of Devonshire, Mr. R. H. Tiddeman, Mr. C. Stainland Wake of Hull, Mr. J. Ray Eddy, F.G.S., of

Skipton, Dr. Wesley, of Wetherby, and Mr. Matthew Foster, of Sancton, near Brough. The Hull Microscopical and Field Naturalists' Club was admitted into union. A vote of thanks was passed to Mr. Tate for his efficient services as local secretary, to Mr. R. H. Tiddeman, Dr. Willis, Mr. W. Gomersall of Otterburn, Mr. Birkbeck of Settle, and Mr. Clapham of Austwick, for their services during the day. Mr. C. H. Bothamley of Leeds reported the progress of the Exhibition Committee. The reports of sections being next business, Mr. Thos. Lister of Barnsley reported for the Vertebrate Section, and stated that Mr. John Grassham of Leeds was appointed on the Publication Committee. Mr. E. E. Prince of Leeds, for the Conchological Section, reported that owing to the absence of conchologists comparatively few species had been collected, and that Mr. Wm. Cash, F.G.S., of Halifax, had been chosen for the Publication Committee. For the Entomological Section Mr. John Grassham of Leeds stated that owing to a similar absence of entomologists none but common butterflies and other insects had been taken. For the Botanical Section Dr. Parsons reported that the Rev. W. Fowler, M.A., president of the section, was elected its representative on the Publication Committee of the Union. The localities explored during the day had been Settle, Giggleswick, Feizor, and Stackhouse. Another route taken was from Malham by Gordale Scar, Malham Cove and Tarn, and Capon Hall to Settle. The present was the first time that the section had met in a mountain-limestone district, and the flora had consequently presented some new features, as the mingling of limestone plants with species of a northern type, and also the abundance of certain very local species. He noticed the abrupt change in passing from the limestone to the Silurian strata, the limestone plants suddenly ceasing, and being replaced by the heaths, *Empetrum*, *Juncus squarrosus*, &c. The number of Vasculares observed during the day was 291, or higher than at any previous meeting, the following being the principal rarities:—*Trollius europæus*, *Meconopsis cambrica* (denizen), *Thlaspi occitanum*, *Viola lutea*, *Alsine verna*, *Geranium sylvaticum*, *G. sanguineum*, and *G. lucidum*; *Cochlearia alpina*, *Potentilla recta* (?), casual, *Rubus saxatilis*, *R. Chamæmoris*, *Rosa mollissima*, *Sedum Telephium*, *Saxifraga hypnoides*, *Carduus heterophyllus*, *Crepis paludosa*, *Hieracium pallidum*, and *H. prenanthoides*; *Vaccinium Vitis-idæa*, *Anchusa sempervirens* (alien), *Primula farinosa*, *Gnaphalium dioicum*, *Salix pentandra* and *purpurea*; *Potamogeton acuminatus*, *P. heterophyllus*, *Taxus baccata*, *Gymnadenia Conopsea*, *Paris quadrifolia*, *Ruscus aculeatus* (alien), *Blysmus compressus*, *Carex ampullacea*, *Sesleria cærulea*, *Kœhleria cristata*, *Asplenium viride*, *Cystopteris fragilis*, and *Nephrodium rigidum*. Mosses and lichens were far more abundant than at any place hitherto visited by the Union. The mosses included *Sphagnum squarrosus* (fr.), *Ditrichum flexicaule*, *Trichostomum tophaceum*, *T. crispulum*, *Tortula tortuosa*, *T. lævipila*, *Racomitrium lanuginosum* (on limestone, a rare occurrence), *R. aciculare*, and *R. heterostichum*; *Ptychomitrium polyphyllum* (fr.),

Philonotis calcarea, *Tetraplodon mnioides* (fr.), *Webera albicans*, *Bryum pseudotriquetrum*, and *B. pallens*; *Mnium serratum*, *Zieria julacea*, *Cinclidotus fontinaloides* (fr.), *Neckera crispa*, *Anomodon viticulosus*, *Hypnum revolvens*, and *H. stramineus*; the hepaticæ, *Chiloscyphus polyanthus*, *Madotheca platyphylla*, and *Reboulia hemisphærica* (fr.), and the lichens *Collema fluviatile*, *Endocarpon miniatum*, &c. Not many fungi were seen, *Cantharellus muscigenus* being the most noteworthy. Among algæ were *Batrachospermum moniliforme*, *Conferva capillaris*, *Nostoc verrucosum*, *Rivularia calcarea*, and *Encyonema prostratum*. Mr. Tate reported for the geological section that the local silurian and carboniferous sections found full occupation for the members. The Moughtow quarries exhibit the carboniferous limestone resting horizontally upon the denuded edges of Coniston flags, separated by a conglomerate of waterworn silurian pebbles in a calcareous matrix. The series of Craven faults was clearly expounded by Mr. Tiddeman during a stroll from Settle by Scalebar Foss and Attermere to the Victoria Cave. Specimens of malachite, heavy spar, galena, calcite and calamine were obtained at the old lead mines. Of the rarer limestone fossils we noted *Psammodus porosus*, *Asaphus granuliferus*, *A. globiceps*, *Bellerophon costatus*, *B. cornu-arietis*, *Pleurorhynchus alæformis*, *Aviculo-pecten concentricus*, *Platycrinus ellipticus*. Dr. Parsons remarked the abrupt change, near Capon Hall and at Malham Tarn, from the calcareous flora to the peat morass covered with heath, *Empetrum*, *Sphagnum*, &c. (hardly a single species being common to the carboniferous and silurian areas), as an illustration of the assistance which a knowledge of botany affords in defining the limits of strata. Mr. Tate says of the Victoria Cave that the remains found within it indicate successive occupations at different ages by man, and by animals now extinct in Britain. The uppermost or Romano-Celtic layer contained Roman pottery and coins, Celtic imitations of Roman coins, dress-fasteners, or "frogs," perforated bone studs, needles, spoon-shaped fibulæ, bone and stone spindlewhorls, bronze brooches inlaid with coloured enamels, bronze and silver rings, transparent and coloured glass beads, with the bones of animals still living in Britain—the Celtic short-horned ox, the goat, pig, horse, dog, stag, badger, fox, and two species of domestic fowl. Interbedded with the limestone talus six feet lower, we come upon the neolithic layer, containing polished stone implements (but no metals), chipped flint tools fastened into bone handles, arrow-heads, bone harpoons, one with double barbs facing in one direction, and a third reversed barb at the base, for attachment to the fish-spearing shaft. The grizzly bear, brown bear, and reindeer evidence a cold climate, and their remains are preceded by twenty feet of glacial deposit, underlying which we have the palæolithic layer, or the hyæna's den, containing the gnawed bones and teeth of *Elephas antiquus*, *Rhinoceros leptorhinus*, *Bos primigenius*, *Hippopotamus major*, *Canis lupus*, and a human fibula, together with a small humerus bearing very evident toolmarks thereon.

In the discussion which followed this report, Messrs. Tiddeman, Jas. Spencer, of Halifax, W. Gomersall, and others took part. The meeting concluded with an interesting general discussion on the geological structure of the district.—WM. DENISON ROEBUCK, Hon. Sec.

THE FIFTH MEETING, on Bank Holiday, Monday, August 5th, was fixed for Bishop's Wood, near Selby, the Yorkshire entomologist's well-known "happy hunting ground." The weather, which both previously and subsequently was rough and stormy, cleared up for the day, and, as usual, the Union was favoured with "Queen's weather." There were about 50 or 60 members present during the day, and, as might be expected, the entomologists—who were almost entirely absent from the previous meeting—turned up in preponderating numbers; and as also might be expected, the crowds of geologists who visited Settle were almost totally absent at Bishop's Wood. A few botanists investigated during the day Brayton Barf, Morton Bog, and surrounding country. After three-o'clock tea, served in a marquee at the Red Lion Inn—and Sections—the general meeting opened at five o'clock in the National School-room, the Rev. Wm. Fowler, M.A., of Liversedge, president of the Botanical Section, occupying the chair. Thirteen Societies were found to be represented. The list of new subscribers included Mr. W. Gomersall, of Otterburn, Bell Busk; Dr. Willis, of Bradford; Mr. Wm. Robinson, of Sedburgh; Mr. Wildman, of Settle; Mr. T. L. Matthewman, of Selby; Dr. R. Spruce, the eminent botanical traveller, of Malton; Mr. Thomas Wilson, of York; and the Rev. H. F. Barnes-Lawrence, M.A., C.M.Z.S., of Birkin Rectory. Votes of thanks to the local secretary, Mr. Wm. Prest, of York; to the Vicar of Brayton, for the use of the school; and to the Ecclesiastical Commissioners, for permission to visit the Wood—were passed. The reports of sections were then taken.—Mr. Roebuck stated that the Conchological Section had been represented by one member only, Mr. J. D. Butterell, of Hull, who had taken many of the common species, but nothing of very special mark.—Mr. W. Prest then reported on the lepidoptera shown in the Entomological Section, as follows:—About 60 species were taken and seen, amongst them being *A. Paphia*, *V. cardui*, *L. monacha*, *C. immanata*, (some fine varieties), *C. pyraliata*, *C. spinula*, *H. nictitans*, *X. scolapacina*, *T. janthina*, *N. umbrosa* (abundant), *O. upsilon*, *G. libatrix*, *B. verticalis*, *C. selasellus*, *P. comparana*, *T. caudana*, *C. Hubnerella*, &c., &c.; also larvæ of *S. ocellatus*, *C. elpenor*, *E. erosaria*, *E. heperata*, *Y. impluviata*, *P. falcula*, *P. palpina*, *N. camolina*, *N. dictæa*, *N. dromedarius*, *N. ziczac*, *N. dodonæa*, &c., &c. Mr. Wm. Denison Roebuck, of Leeds, remarked that the crowded state of the Entomological Section had rendered necessary the splitting off of a sub-section for the "neglected orders," of which several had occurred. The most noticeable beetles were *Lina populi* from Morton Bog, *Strangalia armata* and *Chrysomela staphylea*, from the wood. The best hymenopteron was a black humble-bee

Bombus Harrisellus, taken by Mr. J. W. Shaw of Wakefield. In other groups were noticed the "cleg" (*Hæmatopota pluvialis*), the scorpion fly (*Panorpa communis*), &c. Mr. G. Brook, ter. (Huddersfield) had taken several species of *Collembola*. For the Botanical Section Dr. Parsons reported: The localities explored were Hambleton, Bishop's Wood, Morton Bog, Monk Fryston, Biggin, &c. The nature of the soil varied in these several places between sand, clay, limestone, and peat, and the flora represented corresponding variations. Few special rarities were found, the flora being the ordinary one of a lowland district; nevertheless, owing to the comparative richness in flowering plants of such regions, the number of species observed was fully as great as at any previous meeting. Three hundred kinds were noted, the following being the more noteworthy:—*Clematis Vitalba* (denizen), Monk Fryston; *Genista anglica*, Morton Bog; *Malva moschata*, Biggin; *Rubus incurvatus*, Morton Bog; *R. hystrix*, *R. carpinifolius*, and *R. corylifolius*, Hambleton; *Erigeron acris*, Micklefield; *Leontodon hirtus*, Biggin; *Picris hieracioides*, Biggin and Micklefield; *Gentiana Pneumonanthe*, Morton Bog; *Linaria minor*, Monk Fryston, *Chenopodium rubrum*, Hambleton; *Zannichellia pedicellata*, Monk Fryston (not given for M. W. Yorks. in Top. Bot.); *Potamogeton densus*, and *Sagittaria sagittifolia*, Selby Dam; *Brachypodium pinnatum*, Hambleton (by roadside, rare off limestone); and *Sedum Telephium* (denizen), Hambleton. About 23 mosses and a few other cryptogams were noticed, mostly the very common lowland species. The fungi included *Polyporus hispidus* and *Røestelia lacerata*. On behalf of the Geological Section Dr. Parsons stated that Hambleton stood on the new red sandstone, which rock was well shown in a section at Hambleton Haugh as a soft red sandstone strongly bedded, without fossils. On the southern slope of Hambleton Haugh was a gravel mainly composed of rounded fragments of carboniferous sandstone and grit; on the northern slope of Brayton Barf a few large boulders were scattered about, one of which appeared to be basalt. Of the alluvial strata which surrounded this island of trias and covered the greater part of the area of the district, the most important member was a thick bed of laminated clay, in some places on the surface, in others capped with a thin layer of sand or warp. At Monk Fryston, three miles to the west, the magnesian limestone came to the surface. In a quarry by the railway a quarter of a mile south of Milford Junction, a few fossils had been seen on the weathered surface of the beds, mostly a small species of *Axius*, and some spines, probably off some molluscan shell. In the same quarry was a fault, recently exposed in a new road cutting, and not marked in the Geological Survey map: the magnesian limestone being elevated into juxtaposition with the new red sandstone. Near some calcareous springs at Monk Fryston was a patch of boggy ground full of semi-fossil shells of existing species.—In Vertebrate Zoology the report was given by Mr. E. Hunter, F.C.S., president of the section, and Mr. P. Richardson, both of Goole.—WM. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- Sept. 3. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
" 6. Heckmondwike Juvenile Naturalists'.
" 11. York and District Naturalists' Field Club.
" 13. Huddersfield Scientific Club—Notes on British Association Meeting,
by C. P. Hobkirk and Geo. Brook, ter.
" 14. Yorkshire Naturalists' Union—Excursion to Wharnccliffe; Local
Secretary, W. R. Carter, Dixon Lane, Sheffield. Heckmond-
wike Naturalists'.
" 16. Huddersfield Naturalists' — Paper: "Physiography." — William
Nettleton.
" 17. Leeds Naturalists' Club, &c.—Paper: "The Sexual Reproduction
of Fungi."—Thos. Hick, B.A., B.Sc.
" 20. North Staffordshire Naturalists' Field Club—Excursion to Haddon,
& 21st. Bakewell, Tideswell, and Castleton; Leader, Mr. Lynam.
" 24. Leeds Naturalists' Club, &c.
" 28. Huddersfield Naturalists'.
" 30. Lancashire and Cheshire Entomological Society.

EXCHANGE.

The Editors will be glad to give Sixpence for a copy of No. XXXI.
(February, 1878) of this Journal.

Having collected, during a late tour, some very rare species of birds' eggs,
(side blown), I can offer collectors specimens in exchange for duplicates of all
kinds. Many varieties wanted.—J. W. Sissons, 11, Priory Road, Sharrow,
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No. XXXIX.

OCTOBER, 1878.

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Original Articles.

FLOWERLESS PLANTS, AND THEIR HABITATS.

(Continued.)

BY H. FRANKLIN PARSONS, M.D., F.G.S.

WE now come to the mosses. The word "moss" is very loosely used in popular language, being applied to club mosses, liverworts, lichens, algæ, fungi, and even small tufted flowering plants, as *Sagina*. The plants called mosses (*Musci*) by botanists form, however, a very distinct and easily recognisable order, and present, on a miniature scale, an exquisiteness of design, an elegance of form, and a beauty of colour, which, were they fifty times larger, would give them a high rank among ornamental plants. The stems of mosses are short, sometimes almost wanting, and rarely more than a few inches in length, though in two or three of our British species they sometimes exceed a foot. The leaves vary in outline, but are often ovate or lanceolate, and always simple and sessile. They have usually a single simple nerve, not unfrequently prolonged beyond the blade of the leaf into a bristle-like point; others are nerveless, and others have two short nerves at the base. The nerve contains no vessel, but consists merely of cellular tissue, as also does the stem, and indeed the whole plant. The blade consists usually of but a single layer of cells. The leaves often curl up when dry, and expand when moist; and mosses are remarkable for their power of enduring drying, reviving on being moistened after the lapse of years. The flowers of mosses are of two kinds, sometimes found together, at other times only on different plants. The male flowers consist of sausage-shaped bodies called antheridia, mixed with slender threads (paraphyses), of which the use is not known. The antheridia are composed of cells, each containing a minute filament; these filaments when set free swim with a wriggling movement, and are the fertilizing particles.

The Archegonia are flask-shaped bodies containing an embryo sac, from which the fruit is developed. The fruit is in some kinds borne at the end of the stem, in others in the axils of leaves; the leaves surrounding it are often different in shape from the others. The fruit when young is covered with the calyptra, a membranous envelope like that at the base of a rhubarb leaf. As the fruit-stalk elongates, the calyptra is torn off at the base and carried up on the top of the fruit, leaving sometimes, however, a short sheath surrounding the base of the footstalk. When this night-cap is taken off the top of

the fruit, the mouth of the urn is seen to be closed by a lid, often exactly the shape of the lid of a teapot, sometimes long and conical. Under the lid the mouth of the urn is in most mosses surrounded by one or two rows of teeth, in number either 4 or some multiple of 4 by 2—as 8, 16, 32, or 64. They vary very much in shape in different mosses, but are always brightly coloured, and form beautiful objects. They are highly hygroscopic, and exhibit remarkable movements with varying degrees of humidity or dryness, as when breathed upon, and at each movement a little cloud of spores is jerked into the air. When the spores germinate they develop into a green conferva-like thread, which soon produces stem and leaves, and then perishes.

It is to be noticed that the product of the fertilized germ cell in mosses is not what from the analogy of higher plants we should have expected, a single spore, but a capsule containing many spores. Hence it is considered by Hofmeister and other botanists that there is an “alternation of generations” in mosses like that of ferns, the duration of the two stages being inverted—the persistent sexual stage of the moss corresponding to the prothallus, and the fruit-stalk and capsule of the moss corresponding to the non-sexual perennial fern. Besides the true spores mosses have several other means of propagation; some have creeping rhizomes and send up suckers, the stems of many send out rootlets and take root readily if broken off, others again bear minute green bulbs on the stem or leaves, which fall off and develop into young plants. So efficient are these supplemental means of propagation, that many mosses which are common and abundant are rarely or never found in fruit.

Hepaticæ may be divided into scale mosses and liverworts; the latter have no distinct stem and leaves, the former have. The leaves of scale-mosses have never any midrib, they are placed nearly in the same plane as the stem, and inserted by a broad base, like the mainsail is attached to a mast. They are often of singularly complicated shapes, and furnished with stipules underneath. The fruit differs from that of mosses in several respects; as the stalk elongates, the capsule bursts through the apex of the calyptra, which remains as a sheath surrounding the base of the stalk, generally enclosed in a calyx. The capsule has no lid nor peristome, but contains mingled with the spores spiral elastic threads; when ripe it splits into four valves, and the spiral springs elongating, scatter the spores like a pea is shot out of a child's toy-gun. In the genus *Riccia*, which forms the link with the lichens, the spore-case is imbedded in the frond, it does not burst, and contains no elaters.

The remaining orders of flowerless plants—viz., lichens, algæ, and fungi—belong to the class of Thallogens, which have no distinction between stem and leaves. These orders are hard to define, as they embrace such a large variety of dissimilar forms, and are so closely connected by intermediate links, that the extremes of one order differ much more than some members of the order do from members of another order, and it is therefore very difficult to know where to draw the line. Roughly speaking, it may be said that lichens are perennial aerial plants, containing green chlorophyll cells, and drawing their nourishment from the air, and not from the substances on which they grow, and which they merely adhere to superficially, and do not penetrate. Algæ are plants containing chlorophyll, growing in water or on damp surfaces, and drawing their nourishment from inorganic matters dissolved in water. Fungi are plants without chlorophyll, never aquatic in their perfect fructified state, growing on and penetrating diseased living, or decaying dead, organic matter, and deriving their nourishment from the substances on which they grow. Chlorophyll, I may remind you, is the green matter found in plants which has the power, under the influence of light, of decomposing the carbonic acid of the air, and appropriating the carbon to build up into organic matter.

Lichens vary much in appearance: some are like miniature branching leafless shrubs, others have a flat leaflike frond, and a very large number form merely a crust, closely adhering to the wood or stone on which they grow. The fruit consists of knobs or saucer-like shields, generally of a different colour from the rest of the plant. The male element is supposed to be represented by certain little cavities containing minute rodlike bodies, without movement, called spermatia. Besides these organs, lichens bear very generally powdery warts, called soredia; the grains of which the powder consists germinate, like the bulbils of mosses, into new plants. Many lichens rarely or never fruit, and are propagated almost wholly by the soredia. Microscopically the frond of a lichen consists externally of a cuticle, or layer of closely-packed colourless cells, beneath this is a layer made up of round green cells, called gonidia, which are the active organs of nutrition; the deeper part of the frond is made up of long interlacing filaments, and beneath all is often a darker layer—the hypothallus. The fruit is made up of elongated sacs called asci, each enclosing one or more spores. Mingled with the asci are a number of slender threads called paraphyses. Arguing from the resemblance on the one hand between the gonidia of lichens and certain single-

celled algæ, and on the other hand between the filamentous layer of lichens and the tissues of many fungi, and between the structure of the fruit in lichens, and in those fungi which have their spores contained in asci, certain very advanced German botanists have started the wild hypothesis that lichens are not a distinct order of plants at all, but fungi, which enclose within their substance lowly organized algæ—the gonidia—and detain them as slaves, to provide their captors with nourishment by decomposing the carbonic acid of the air.

Fungi consist of two elements—the vegetative structure, and the fructification. The vegetative structure, or mycelium, is made up of long interlaced thread-like cells, which penetrate the decaying substances from which they draw nutriment. In the mushroom this part of the plant may be found as a white, cottony-looking substance, penetrating the earth around the bottom of the stem : while what we call the mushroom is really not the whole plant, but only the fruit. The fruit in the simplest fungi, as moulds, consists merely of spores borne on the ends of the threads ; in the larger and more complex fungi, the spores are produced from a special fertile layer, called the hymenium (in the mushroom forming the radiating gills or plates underneath) ; this is borne on a fleshy receptacle made up of compacted filaments. There are two main divisions of the fungi : in the first the spores are borne free either on the surface or in the interior of the receptacle ; in the other the spores are borne, as in lichens, in sacs or cells, called asci. The number of spores produced is very vast, and fungi have, in addition, other means of propagation—as conidia, which are powdery excrescences something like the soredia of lichens. Indeed so varied are the stages in the life history of the fungi, that the progress of research is continually tending to lessen the number of species, by showing that what had been thought to be distinct kinds, belonging even to different families, are really only different conditions of one and the same plant.

Algæ differ vastly in form and size ; many are microscopic, consisting, like the red-snow plant, of a single cell ; while on the other hand some of the seaweeds attain a large size, those forming the great floating masses called Sargasso (of tropical seas) being among the largest known plants. The algæ are classed in three divisions, viz : the red, the brown, and the green, the first two being exclusively marine, while the green forms are many of them found in fresh water. All the varied hues of colour depend upon the presence of varieties of chlorophyll, by the possession of which algæ are distin-

guished from fungi. In algæ the thallus, or vegetative part, forms the greater part of the plant, the fructification being inconspicuous, and in some kinds rarely met with; in fungi the fructification is usually the most conspicuous part of the plant. Algæ consist entirely of cells, sometimes embedded in a mass of jelly. In the simplest forms each cell constitutes a distinct plant, in others the cells are placed end to end in one or many rows, forming long threads, and in many seaweeds they form flat expanded leaflike fronds. One order—the diatoms—is remarkable for the cell wall being of flint, and exquisitely sculptured with lines and markings of wonderful diversity. Many of the lower algæ possess astonishing powers of locomotion: thus the unattached Diatoms swim with a darting movement, *Oscillatoria* by slow side-to-side undulations; *Vibrio* by rapid wriggling; *Volvox* and its allies, by means of cilia.

The fructification of algæ is very varied; we often find several different kinds in the same species. The principal forms met with are, antheridia containing moving, fertilizing particles; spores contained in definite spore cases; resting spores formed from the cell contents after fertilization; tetraspores, cells containing spore-like bodies in clusters of four; and zoospores, green bodies formed without impregnation from the contents of the ordinary vegetative cells, swimming actively by means of cilia, and which have even been said to possess an eye to guide their movements by.

In some of the green algæ we find the process of fertilization reduced to its simplest possible form—two exactly similar cells, lying side by side, become connected by a transverse tube like the letter H. The green cell contents are all collected either into one of the cells or into the transverse tube, forming a round mass, which ultimately breaks up into spores.

There is yet one other order of *Cryptogamia*—the Characeæ—which I should probably have forgotten had I not been reminded of it by finding an interesting example on Saturday. I cannot be said, however, to have missed it out of the proper sequence, for these plants are so utterly unlike all others that it is not known what their proper place is; they are sometimes placed after the vascular acrogens, at others next the algæ, but in either case simply as a matter of convenience. Like Equisetacæ, Characeæ is a small order consisting of but a single genus, *Chara*—of world-wide distribution and of great antiquity, being at least as old as the lias. Charas are leafless water plants with a thread-like stem, and whorls of branches bearing branchlets; they have an unpleasant odour, and are generally

incrusted with carbonate of lime. The stems and branches are made up of tubules, in which the circulation of the cell contents is plainly visible under the microscope. The reproductive organs arise at the junction of the branchlets with the branches, and are of two kinds, called granules and nucules. The granule, or male organ, is a small bright orange body ; it has two coats, the outer is transparent, the inner is orange red, and made up of eight three-cornered plates, composed of triangular cells. These cells project at the edges, forming indentations, by which the plates are locked together, like the bones of the skull ; when ripe, however, they burst open. From the centre of each plate a tube projects internally, these in the centre of the granule meet together and are connected with each other and with another pillar, which is a continuation inwards of the short stalk by which the granule is attached to the branch. From this point of union spring a number of long wavy, closely-jointed threads, each joint being a cell in which is developed a moving filament like those of mosses. The nucule is an oval body made up of a mass of cells ; and coated with five spirally-twisted tubes, the points of which project at the top of the nucule like a crown ; in the centre between them is a minute opening by which the fertilizing particles are supposed to gain access to the interior. The nucule, when ripe, falls off and germinates, producing a prothallus, from which several young plants arise by budding. Thus countless thousands of fertilizing filaments are produced for each nucule to be impregnated ; we meet, however, with a similar disproportion between the number of pollen grains and ovules in some flowering plants, especially those fertilized by the wind, as the hazel and the yew.

Having thus given a brief description of the flowerless plants, I now come to the second part of my paper, viz., their "habitats,"—i.e., the places in which they grow. The geographical distribution of the cryptogams has been but imperfectly worked out, but is a field full of promise to the student of geographical botany. These plants are far less liable than the flowering plants to be introduced or exterminated by direct human agency ; the influence of man upon the cryptogamic vegetation is indirect in providing or removing the conditions of soil, atmosphere, and moisture suitable to their growth. The following remarks will have reference especially to the perennial mosses liverworts and lichens ; the other orders for the most part either follow the same general laws, or depend for their occurrence rather upon the presence of the particular soil required by them, than upon climatic conditions or geographical situation.

(To be continued.)

Short Notes and Queries.

Seligeria tristicha IN ENGLAND.—In the Aug. number of the *Naturalist*, under the heading “Another Moss new to Yorkshire,” it is said : “The moss (*S. tristicha*) is not only new to Yorkshire, but to England as well, the only stations hitherto known for it being in the Blair Athole district of the Scottish Highlands,” (where it was found by Miss McInroy in 1860). In Schimper’s “Synopsis of European Mosses,” however, under the heading “New Stations for some of the rarer Mosses,” there is given : “*Seligeria tristicha*, on limestone rocks near Castleton, in England. (Whitehead).” Is this the Castleton near the Peak in Derbyshire?—J. S. WESLEY. [We should be glad if Mr. Whitehead would reply to this.—*Eds. Nat.*]

STONECHAT, YELLOW HAMMER, AND PIED WAGTAIL.—In answer to Mr. Roberts’ question (*Naturalist* Vol. 4, p. 23) as to whether the yellow-hammer and pied wagtail are absent in winter in this district, I may say in reference to my notes on the arrival of spring migrants (vol. 4, p. 10), there is an error—Instead of yellow-hammer which is said to have arrived on the 27th April, it ought to have been yellow woodwren. The pied wagtail unquestionably leaves the neighbourhood in winter, neither is this a matter of surprise when the character of the locality is considered ; occasionally a few may stay in exceptionally mild winters, although I have not been so fortunate as to see any. I was surprised, however, to see one in the first or second week in November, 1870, near the station yard, at Sedbergh ; this seemed even a more unfavourable place, as a winter residence, than this locality. Respecting the stonechat I quite reciprocate Mr. Roberts’ remarks as to the desirability of more light being thrown on this subject. I have obtained what information I could respecting it, viz :—whether the stonechat habitually breeds in this neighbourhood ; and have investigated during the past season all the most likely places in this district for the purpose of discovering it breeding, but failed to establish its claim. An old naturalist, however, tells me he once found a nest near this village on a heathy waste. My father, who knows the bird well, says he has never met with it here, although he has found it not uncommon near Clapham. My brother never found it during the years he was collecting in this part. So it would appear that if it does breed at all it is a very rare visitor. This conclusion is not based on the phenomena of an exceptional season, but from observations extending over a number of years. This local distribution of the stonechat has often puzzled me, especially when taken in connection with its alleged wide geographical range. It is certain that the species in question is often confounded both with the whinchat and the wheatear, indeed stonechat is invariably applied as a local name to the wheatear in this district, and also in other parts of England and Scotland. May not this fact, to some extent, account for its being

regarded as a common and generally distributed species? At least if it is common with us I can explain my anomalous position only on the supposition that I "cannot see 'em for looking at 'em."—E. P. P. BUTTERFIELD, Wilsden, September 14th, 1878.

STONECHAT.—Since my note in April on the stonechat, I have searched both likely and unlikely places for this bird, especially on Dalton Bank, where the one was shot on the 5th of April last, but I have not had the pleasure of seeing one. I also spent the first week in May with my friends at Hebden Bridge, and was not successful there; and my friend Mr. Sam Gibson, a good ornithologist, has only one record of it occurring there. It is a bird that frequents flat and low-lying land. I have always found it on the seacoast both west and east, and also in north and south Wales, and plentiful at Sherwood Forest.—JAMES VARLEY, Almondbury Bank, Huddersfield, Sept. 5th.

TERN.—On August 24th I went out of the house at 11 p.m., and heard the well-known cries of some terns: they continued to fly round for more than an hour, keeping up a constant cry. I went out again early the following morning to see if they had settled on any of the dams, in order that I might determine the species.—JAMES VARLEY, Almondbury Bank, Huddersfield, Sept. 5th.

THE HAWFINCH BREEDING NEAR LEEDS.—I have to record the discovery last spring, between Coble Hall and Roundhay, of the hawfinch's nest. It was placed high up in a holly tree, and was such as to remind one of the ring-dove's flat platform of a nest, consisting of a foundation of small sticks and twigs, lined with roots, hay, &c. It contained five eggs, which were easily identified as those of the hawfinch (*Coccothraustes vulgaris*). This summer a hawfinch was caught in a garden near Newlay; it was a fine female, and was easily taken by a boy, having gorged itself with berries to such an extent as to prevent its escape. Another specimen was shot last December, near Otley.—WALTER RAINE, 5, Leeds Terrace, North Street, Leeds, Sept. 17th.

Nonagria Hellmanni AT MONK'S WOOD.—Two moths sent to me for identification by Mr. Harold Hebblethwaite, of Bradford, are this species. He took them in August last, at Monk's Wood, in Huntingdonshire, which is a new locality for this local insect.—GEO. T. PORRITT.

Unio margaritifer AT WHITBY.—On September 9th I took in the river Esk, near Whitby, *Unio margaritifer*, L., and the variety *sinuata*, Lam.—H. CROWTHER, The Museum, Leeds.

CORRECTION (PAGE 8).—An unfortunate clerical error crept into our review of "West Yorkshire," which should have been corrected in our last issue. The scale of the maps should have been quoted as "four miles to the inch," instead of "four inches to the mile."—Mr. Lees also

wishes to state that our remarks with respect to the Storthes Hall locality of *Cardamine amara* are in error. He was not really aware that it was found there, and that his including it in his list did not refer to that locality, but referred generally to the district. We gladly make this correction, as, knowing that it had been *planted* by the stream at Storthes Hall, we were under the misapprehension that he had that spot in his mind.

AUTHOR'S CORRECTIONS.

Page 3, 19th line from bottom	read	"intermediate"	for	"immediate."
" 5, 20th	"	top read	"protonemata"	for "protonema."
" 5, 24th	"	"	" <i>hygrometrica</i> "	for "hygrometria."
" 5, 29th	"	"	"protonemata"	for "protonema."
" 5, 34th	"	"	do.	do.
" 5, 35th	"	"	"stops"	for "stop."
" 6, 5th	"	"	"the protoplasm"	for "a protoplasm."
" 6, 25th	"	"	"mosses"	for "moss."
" 13, 9th	"	"	"331"	for "314."

[RAINFALL FOR AUGUST.—As we have only received three returns, we have omitted the usual table in this issue.—EDS. NAT.]

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting September 17th.—The president, Mr. T. Lister, gave a few notes of birds at this season; amongst them were flocks of wild geese, ducks, and gulls, on the 8th instant, and throughout the month starlings, young and old, appeared in immense flocks. Herons and kingfishers were observed in the Cannon Hall pools and the valley of the Dearne. He named the most noteworthy birds seen in Ireland during the excursion of the British Association—as the gold-crest at Killiney; coots, redshanks, herons, grey wagtails, dunlins, great and lesser black-backed gulls, black-headed gulls, in Dublin Bay, on the Liffey, and in Wicklow, also on the voyage, with occasional terns, cormorants, many of these in Wales; also ravens, daws, and moorpipits, above the peak of Snowdon. August 24th, Mr. Hailstone writes that three terns were on Walton Lake. Few summer birds have been noticed, cuckoos were on the moors on the 12th and succeeding days, the goat-sucker was there as late as the 20th. The yellow wagtail near Barnsley, September 11th. Redstart heard in song, September 13th. All of the swallow family have been seen September 8th. The swallow martin and sand-martin September 15th to 18th, as well as the willow wren.

BRADFORD NATURALISTS' SOCIETY.—Meeting Aug. 20th, the president in the chair.—Mr. Jagger exhibited *Spiranthes aestivalis*, *Scutellaria minor*, *Wahlenbergia hederacea*, and *Hypericum elodes*; from the New Forest. Mr. Andrews shewed from Gordale, *Leonotodon pratensis*, *Thalictrum montanum*, and *Viola lutea*. Mr. Hebblethwaite read a paper on his visit to Monk's Wood, and the neighbourhood, at the same time shewing his captures, among which were *A. galathea* and *N. Hellmanni*, the last being new to Monk's Wood according to Mr. Porritt. The following new district records were shewn:—*M. maura*, Saltaire, by Mr. Lambert; *M. literosa*, by Mr. Andrews. The president showed a large number of insects from the New Forest.

MEETING Sept. 3rd, the president in the chair.—The president gave a lecture on his recent tour in the New Forest and the fen country, which was chiefly devoted to entomology. Mr. Soppitt then gave a paper on a short visit to Southport, devoted to botany and entomology. Mr. Gilliver showed a number of shells, including *Convolvulus denticulatus* and *Helix arbustorum*, var. *alpina*, from Scarbro'; Mr. Carter, a series of *Abrazas grossulariata*, including the light and dark varieties figured in "Newman's Moths."

MEETING Sept. 17th, Mr. Firth in the chair.—Mr. H. Hebblethwaite showed *Z. minus*, var. *nubigena*, received from Mr. Birchall; he also showed, along with Mr. Starling, *A. suffusa*, new to the district; Mr. Andrews, the larvæ of *O. bidentata*; Mr. West, *Rosa Sabini*, from Roundhay, *Potentilla Norvegica* from Armley, *Ulex nanus* (Forster), from Doncaster, *Senecio saracenicus* from Meanwood, and viviparous states of *Triticum caninum*, *Juncus lamprocarpus* (Ehrh.) and *Festuca ovina*, from Shipley, Riccall, and Whernside respectively.—WM. WEST, Secretary.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting August 31st, Mr. J. Mackenzie, v.p., in the chair.—A monograph of the British Copepoda (Ray Soc.) and the transactions of the Hull Philosophical Society, were added to the library. The following specimens were collected and sent for exhibition by Mrs. J. Tindall:—Hematite iron ore from the boulder clay in the cliff at Bridlington, and the marine shells *Trochus maculata*, *Buccinum undatum*, and var. *contrarius*—the latter very rare—from Flamborough. Mr. Mackenzie said that hematite iron was now largely used to imitate gems, in brooches, &c., some of the best kinds being hardly distinguishable, even by a practised eye, from real stones.

MEETING Sept. 16th, Mr. Wm. Nettleton, president, in the chair.—A large number of plants were exhibited by Messrs. J. Shaw and James Sykes, and were named by Mr. Shaw, assisted by Mr. John Bartlam, the rarest being a specimen of *Delphinium consolida* from the "tipping" at Carr Pitt; Mr. Mackenzie exhibited and named the following fungi from Airedale:—*Phallus impudicus*, *Cantharellus aurantiacus*, *Marasmius*

oreades, *Agaricus trichisporus*, *A. velutinus*, *A. Foeniseii*, *A. rubi*, *Hirneola auricula-judea*, and *Thelephora mollissima*; Mr. J. Tindall, some casts of fossils from Marsden; Mr. J. Whitwam specimens of *Rhynchonella* from the chalk, and *Paludina orbicularis* from the upper eocene. Mr. Nettleton read a paper on "Physiography," being chiefly a criticism on the Government system of science classes, after which there was a short discussion.—C. H. BOULD, Hon. Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting Sept. 13th, the president, Mr. G. T. Porritt, in the chair.—Mr. C. P. Hobkirk showed a specimen of the "seven-foot coal" from the grey bed at Newcastle, also of the trap rock that strikes through it. The chairman, the following lepidoptera:—*Crambus contaminellus*, *Agdistes Bennetti*, and *Pterophorus spilodactylus*, from the Isle of Sheppey; *Eupithecia succenturiata* and *Orthotelia sparganella*, from Wicken Fen; a dark and interesting variety of *Cidaria russata* taken at Berry Brow on the 6th inst.; *Phycis adornatella* and *Rhodophaea suavella*, sent from Bristol; also the larvæ of *Hybernia leucophearia*, preserved and sent to him by Lord Walsingham. Mr. George Brook, ter., showed a small, but very good and useful new microscope, by Browning: it had the regulation screw, and was only thirty shillings complete. With it he exhibited the following micro-fungi:—*Sphaeria herbarum*, *Peziza trechispora*, *Achlya prolifera*, and *Tuber aestivum*. He also laid upon the table specimens of *Aster Tripolium* and *Statice Bahusensis*, gathered by himself at Howth Bailey Lighthouse, on the occasion of the recent excursion of the British Association there. The president stated that one of his correspondents had taken over seventy specimens of the rare *Nonagria brevilinea* at Ranworth Fen this season; also that Mr. Hodgkinson had bred ten *Cidaria reticulata*. Messrs. Hobkirk and Brook then read papers entitled "Notes on the British Association Meetings," giving details of the various natural history papers read, of the excursions, and of their reception as delegates of the Union to invite the Association to Sheffield next year.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting August 26th, Mr. S. J. Capper, president, in the chair.—Mr. W. W. Keyworth, of Alderley Edge, read a paper on the Macro-Lepidoptera of Mid-Cheshire, mentioning, amongst the numerous captures during the past year by himself, the very rare hawk-moth *Chærocampa celerio*. The president invited the inspection of the members to the 3rd to 6th numbers, just published, of the "Larvæ of the British Lepidoptera, and their Food Plants," by Owen S. Wilson, Esq. Mr. Mosley, of Huddersfield, sent several specimens of *Scoparia cembra* for distribution amongst the members. Several interesting insects were then exhibited by the following gentlemen:—Mr. W. W. Keyworth, *C. celerio*; Mr. West, a fine specimen of *A. Atropos*, taken on the 1st of July in the vicinity of Liverpool; Mr. Sharp, plates of foreign lepidoptera; Mr. Johnson, several *C. filigrammaria*.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—304th meeting, Aug. 27th, Mr. Jas. Abbott, v.p. in the chair. Mr. J. R. Murdoch exhibited a number of well-mounted mosses; Mr. James Reid showed a number of very fine shells, amongst which were some good specimens of *Cypræa*, *Conus*, *Voluta*, *Oliva*, &c. Worthy of special mention were very fine *Mitra papalis*, *M. episcopalis*, *Cardium Cardissa*, and *Solarium perspectivum*. Mr. James Fogg showed a fine female specimen of *Sirex gigas*, and Mr. Samuel Jefferson, F.C.S., two living females of *Sirex juvenicus* (but differing from the usual description of that species in the antennæ being black and not yellow, and in this respect agreeing with *S. melanocerus* of Thomson), and a piece of the larch timber which they had bored, from a colliery near Barnsley. Slides of various marine polyzoa were brought by Mr. W. Barwell Turner, and other microscopic objects by Mr. F. Emsley. Eggs of the Bohemian waxwing, grasshopper warbler, melodious willow wren, hawfinch and ciril bunting, and beautiful varieties of those of the black-headed bunting and red-backed shrike were shown by Mr. Walter Raine. Other specimens were shown by various members.

305TH MEETING, Sept. 23rd, Mr. Benjamin Saynor in the chair.—Mr. Edward Thompson read a paper on "Methods of Reasoning in Science."

306TH MEETING, Sept. 10th, Mr. Samuel Jefferson, F.C.S., v.p., in the chair.—He exhibited various objects from his marine aquaria, including a *Mytilus edulis*, on which was fixed a cirriped, and upon that in turn an anemone two months old, also other anemones, some with the tentacles just developing: when very young it is noteworthy that the tentacles are ciliated. Mr. W. Raine showed eggs of snowy owl, white owl, tawny owl, little owl, great black woodpecker, passenger pigeon, hoopoe, and raven. A number of eggs of commoner species were shown by Mr. Henry Marsh. Mr. John Grassham showed imagos of *Liparis salicis* (Meanwood, June 30th), *Ennomos erosaria* (taken at the Bishop's Wood meeting of the Union, August 5th), and *E. tiliaria* (Meanwood, August 18th); larvæ of *Pygæra bucephala*, *Orgyia pudibunda*, and *Noto-donta camelina*, from Bishop's Wood; a very large female *Sirex gigas*, taken in Wade Street, Leeds; three spiders—*Epeira quadrata* (female), *E. diadema* (male and female), and *E. scalaris* (female)—from Bishop's Wood; and five species of shells. Mr. W. Denison Roebuck showed specimens of *Cionus scrophulariæ* and its curious cocoons, which were found by Mr. S. L. Mosley, of Huddersfield, on figwort, in the larval and pupal states, at Muker in Swaledale. Mr. E. C. Rye has confirmed the name. Other exhibits, principally microscopic, were made by Messrs. F. W. Edwards, F. Emsley, B. Saynor, and W. Barwell Turner. A letter from the Town Clerk was read, giving permission for the members to investigate the fauna and flora of Roundhay Park, and to collect therein natural history specimens and microscopic objects; a vote of thanks to the Corporate Property Committee of the Leeds Town Council was thereupon passed.—WM. DENISON ROEBUCK, Secretary.

NOTTINGHAM WORKING MEN'S NATURALISTS' SOCIETY.—Meeting Aug. 5th.—Mr. W. Watchorn exhibited one larva of the rare *Acronycta alni*, which he had found at Cotgrave on August 3rd. This is, so far as I know, the first instance of its occurrence in this neighbourhood.—W. T. WRIGHT, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, Sept. 7th, Mr. C. Sheard, v.p., in the chair.—Mr. T. Hirst exhibited the following birds and animals:—silver plover (a rare species), snowy owl, pair of albino rats, and tiger cat from Africa. Mr. J. Ogden exhibited a number of lepidoptera caught at Scarborough.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, Sept. 2nd, at Burwood, Mr. Smith in the chair.—Mr. B. Garside showed eggs of quail, found on Greetland Moor by Mr. R. W. Calvert.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Sept. 5th, Mr. J. Wilcock, v.p., in the chair.—Master E. E. Talbot exhibited *Acronycta leporina*, larvæ found feeding on willows. Mr. J. W. Shaw, several species of bees, including *Bombus Harrisellus*, taken at Bishop's Wood. Mr. Sims, *P. chrysitis*, *X. citrigo*, *A. nebulosa* (bred), *M. hastata*, *N. pulveraria*, taken in the district, and others. Mr. Spurling reported *A. Atropos*, taken near Wakefield, and spotted crane (*Crex porzana*), captured at Lofthouse.—J. W. SHAW, Corr. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, August 14th, Mr. Wm. Chapman, v.p., in the chair.—The chairman exhibited a species of *Pholadomya*, taken in the middle shale and sandstone of inferior oolite, and gave a very interesting account of his visit to the Cleveland district. Mr. Sharpe, a fine pale-buff specimen of the common yellow-hammer (*Emberiza citrinella*), shot in the Isle of Wight. Mr. Bacon, nest and eggs of the lesser redpole (*Fringilla linaria*), also some remarkable varieties of the tree pipit (*Anthus arboreus*). Mr. A. Turner, specimens of *Cidaria immanata*, taken at Bishop's Wood on Bank Holiday. The hon. secretary, Mr. Prest, a very remarkable variety of *Epione vespertaria*, a species only taken near York, the right superior wing being like the female, the left lower part female, and about a third of it on the costa male, the under wings male, antennæ, one side male, the other half male and female, and the body all male. It was taken at Sandburn by Mr. Prest, on the 20th of last month.

MEETING Sept. 11th, Mr. M. Smith in the chair.—Mr. C. H. Sharpe exhibited a case of albino and pied examples of the common sparrow (*Fringilla domestica*), the pied and albino ones shot at the Priory Farm, Carisbrook, Isle of Wight, and the smoky one at Chester. Mr. Helstrip, a large box of an Indian silk-moth, all bred from cocoons sent to him from India. Mr. Postill, a specimen of *Cidaria immanata*. The secretary, Mr. Prest, a large box of insects taken by himself during a visit to Edwinstowe, on the borders of Sherwood Forest, among them were a long series of *Euperia fulvago*, *Noctua glarea*, and *Cidaria immanata*, also a few

each of *Noctua neglecta* and *Dahlia*, *Agrotis suffusa* and *agathina*, *Apamia fibrosa*, *Stilbia anomala*, *Crambus pinetellus* and *inquinatellus*, &c.

YORKSHIRE NATURALISTS' UNION.—The sixth and closing meeting for 1878 was held on Saturday, the 14th September, at Wortley for Wharnccliffe Woods. By kind permission of the Earl of Wharnccliffe the members were allowed to search for insects, &c., and to traverse the private roads during the day. The day was fine and very enjoyable. The attention of members, of whom there was a large gathering (including at one time the Earl of Wharnccliffe), especially from Sheffield, was chiefly confined to the woods and craggs of Wharnccliffe Chase, one of the remains of the forest country which was once co-extensive with Sherwood Forest, and was in ancient times the haunt of Robin Hood and his outlaws, as well as of such fabulous monsters as the "Dragon of Wantley." Tea was served at 4, sections met at 4-45, and the general meeting opened at 5-30 p.m., under the presidency of Mr. Henry Clifton Sorby, F.R.S., of Sheffield. The roll-call showed that 16 of the 28 societies were represented. The total attendance would be about 80 or more. The list of additional subscribers included the Earl of Wharnccliffe, Rev. Wm. Jessop, Governor of Wesley College, Sheffield, Messrs. Geo. Tindall (Doncaster), Matthew B. Slater (Malton), George Jackson (York), Wm. Standerling (Selby), F. Northrop (Skipton), H. Stowe Bell, A.R.S.M. (Sheffield), G. R. Vine (Attercliffe), Thos. Andrews, F.C.S. (Wortley), E. B. Jenkinson, F.G.S. (Swinton), Jno. Guest, F.S.A. (Rotherham), Jno. Hutchinson (Barnsley), A. H. Allen, F.C.S. (Borough Analyst, Sheffield), and Samuel Drew, D. Sc. Ed., F.R.S.E. (Chapelton, near Sheffield). On the motion of the Rev. William Jessop, seconded by Mr. Alfred H. Allen, F.C.S., a vote of thanks to the Earl of Wharnccliffe for the permission to explore the woods and to traverse the private roads, was passed; and also, on the motion of Mr. C. C. Hanson, of Stainland, seconded by Dr. Parsons, one to Mr. W. R. Carter, of Sheffield, for his services as local secretary. Dr. Parsons stated on behalf of the Map Committee that in the tracing of the contour lines from the 6-inch ordnance sheets, they would be glad to be assisted by such of the members as would undertake a portion of the work. The secretary (W. D. R.) then read a statement concerning the proposed exhibition at Leeds in connection with the annual meeting, urging the members to let the committee know early what they intended to exhibit, and reminding them that it being a county and not merely a local exhibition, it would rest with the members to render it worthy of the Union and of Yorkshire. He announced that the guarantee fund had reached the amount of £201. The reports of sections were then given, as follows:—Mr. James Spencer, of Halifax, secretary of the Geological Section, reported: The Section had met in the large room at the Wortley Arms Hotel, at 5 o'clock, Mr. Sorby, F.R.S., P.G.S., &c., president of the Union, in the chair. The chairman read a short paper on "The Geology of the District," of which the following is a sketch. The strata at Wharnccliffe and Wortley consist of the lower coal measures; to the west

we have various members of the millstone grit series—the rough rock, third grits, and the Kinder Scout grits. The sandstone rocks of Wharnccliffe Craggs belong to the Greenmoor rock (or Elland flag rock). The lowest coal is the so-called soft coal of Deepcar, 60 yards above which we have the well-known gannister coal, which varies in thickness from two to four feet. The general character of the gritstones of the lower coal measures is like that of the millstone grit. The main direction from which the material of the beds of both formations have been drifted is north-east. It has long been thought by geologists that the grit rocks must have been derived from the granite, but the quartz and felspar are rarely found associated together so closely as to indicate the character of the original rock. Mr. Sorby has, however, detected some actual pebbles of a granite which is quite different from any met with in England, but closely resembles the coarse-grained granite of Norway. These facts seem to prove that in the carboniferous epoch a large tongue of land projected from the coast of Norway into what is now the North Sea, and it was from the detritus of that ancient land that the grits and sandstone of the coal measures and millstone grit were mainly derived. Boulder beds: The district about Sheffield is very free from erratics and glacial drift. This may be attributed to the high ground of the Pennine chain cutting off the glacial currents which came down East Lancashire from this district. Mr. Sorby has, however, found a few pebbles of granite and other travelled boulders, but they are so few that the manner in which they came is very uncertain. An interesting discussion took place concerning the premature decay of many of the fine oaks and other trees in Wharnccliffe Woods. Mr. Samuel Drew, F.R.S., D.Sc.E., said that this was probably owing to the exhaustion of the potash from the soil, and that perhaps some other trees might succeed better, on the same principle as a rotation of crops. A number of fossils collected during the day, chiefly by the secretary, were placed on the table and named. The secretary (Mr. James Spencer) reported to the general meeting: The rocks of the district of the day's ramble, belonging to the lower coal measures, contain a rich suite of organic remains—the gannister coal being well known for its fossils, both animal and vegetable. The roof of the coal contains an abundance of marine shells and fishes, while the coal itself contains certain round balls, rich in vegetable remains. He had found to-day *Dadoxylon Oldhamii* (a kind of pine), *Lepidodendron selaginoides*, *Sigillaria vasculare*, *S. organum*, *Stigmaria ficoides*, *Amyelon*, fern stems, and spores in abundance; while the baum-pots had yielded *Goniatites Listeri*, *G. Looneyi*, *Orthoceras*, *Nautilus*, *Aviculo-pecten papyraceus*, *Posidonomya*, and other shells. Dr. Parsons had found in the shales at Wharnccliffe *Anthrocosia*, *Goniatites Listeri*, *Aviculo-pecten papyraceus*, *Posidonomya*, *Stigmaria ficoides*, while fine specimens of *lepidodendrons* in the stone had been observed by other members. Dr. Parsons, F.G.S., of Goole, secretary of the Botanical Section, reported as follows:—The places visited during the day were Oughti-

bridge, Wharnccliffe Woods, Wortley, Bradfield, &c. The number of species of vasculares recorded was only 101, against 300 at Hambleton, and 290 at the Settle meetings; the falling off was due partly to the season being too far advanced, partly to the less extent of ground covered, but especially to the poverty in species of the local flora in this as in other coal-measure districts. The best finds were—*Ranunculus Lenormandi*, *Corydalis claviculata*, *Ulex Galli*, *Prunus Padus*, *Rubus Koehleri*, *Rosa mollissima*, *Lamium Galeobdolon*, *Myosotis repens*, *Salix Smithiana*, *Taxus baccata*, and *Carex lævigata* from Wharnccliffe, *Alopecurus agrestis* from Oughtibridge, and the curious *Cotyledon umbilicus*, with its succulent trumpet-shaped leaves, from Bradfield. Of mosses twenty species were found, including *Dicranum falcatum*, *D. palustre*, *Campylopus flexuosus*, *Pogonatum aloides*, *Grimmia apocarpa*, *Mnium serratum*, *Plagiothecum undulatum*, and *P. elegans*; the larger Hypnaceæ were comparatively scarce. Six Hepaticæ were noticed, including *Scapania undulata*, *Jungermannia barbata*, *Calypogeia Trichomanis*, and *Lepidozia reptans*. The larger foliaceous saxicolous lichens were plentiful as regards individuals, on the loose blocks of gritstone, which lay scattered about in great profusion. Corticolous lichens were scarce and stunted. The following were the species of lichens observed:—*Cladonia cornucopioides*, *C. furcata*, *Evernia furfuracea*, *Platysma glaucum*, *Cetraria aculeata*, *Parmelia saxatilis* and *P. physodes*, *Peltigera canina*, and *Usnea barbata*. No algæ were seen; a filamentous substance found in a stream of ferruginous water issuing from an old colliery, seemed to consist wholly of oxide of iron, without any vegetable tissue. Fungi were plentiful in the woods, and about twenty kinds were recorded. The most remarkable was *Cynophallus caninus*, a species the singular appearance of which is well indicated by the name; this was found by Dr. Lees and stated by him to be new to South-west Yorkshire. Among the other species were *Agaricus vaginatus*, *A. rubescens*, *A. muscarius*, *A. melleus*, *A. rutilans*, *A. laccatus*, *A. squarrosus*, *A. hypnorum*, *A. semilanceatus*, *Hygrophorus psittacinus*, *H. miniatus*, *Lactarius quietus*, *Russula virescens*, *Paxillus involutus*, *Boletus luridus*, *Polyporus betulinus*, and *Calocera viscosa*. Entomological Section: Messrs. S. D. Bairstow, C. W. Richardson, G. T. Porritt, and others had collected about thirty species of lepidoptera, but mostly of the commonest description, *Notodonta dromedarius* and *N. camolina* being the only ones worth mention. Hemiptera and hymenoptera (*Tenthredinidæ*) were abundant, however, and in tolerable variety. Mr. Thomas Lister, of Barnsley, secretary of the Vertebrate Section, reported that the section was inferior at Wharnccliffe to previous meetings. There were eighteen resident birds, amongst which were the kestrel, ring-dove, mountain linnet, magpie, and a flock of Canada geese, only three summer migrants were seen, the swallow, martin, and wheat-ear. The Conchological Section was not represented, and only one species of mollusk was actually reported.—WM. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- Oct. 1. Bishop Auckland Naturalists' Club.—Liversedge Naturalists'.—Leeds Naturalists' Club, &c., Paper by John Emmett, of Boston Spa.—Huddersfield Literary and Scientific Society, Annual Meeting, President's (C. P. Hobkirk, F.L.S.) Valedictory Address: "Science 200 Years Ago."—Bradford Naturalists', Paper by Mr. Spencer.
- " 4. Heckmondwike Juvenile Naturalists'.
- " 8. Leeds Naturalists' Club, &c.
- " 9. York and District Naturalists' Field Club.
- " 11. Huddersfield Scientific Club, 8 p.m., Paper: "A Fortnight in the Fens," by G. T. Porritt, F.L.S.
- " 12. Heckmondwike Naturalists'.
- " 14. Huddersfield Naturalists', Paper: "Vegetable Cell Theory," by Joseph French.
- " 15. Leeds Naturalists' Club, &c., Paper: "Natural Objects used as Symbols in the Arts," by William Howgate.—Bradford Naturalists', Paper by Mr. Prince.
- " 19. North Staffordshire Naturalists' Field Club, Excursion to Stafford and Penkridge.
- " 22. Leeds Naturalists' Club, &c.
- " 26. Huddersfield Naturalists'.
- " 28. Lancashire and Cheshire Entomological Society.
- " 29. Bradford Naturalists', Paper by Mr. Soppitt.
- " 31. Conchological Society at Leeds.

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The Naturalist :

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AND

GENERAL FIELD CLUB RECORD.

NEW SERIES.

EDITED BY CHAS. P. HOBKIRK, F.L.S., AND G. T. PORRITT, F.L.S.

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Original Articles.

FLOWERLESS PLANTS, AND THEIR HABITATS.

(Concluded.)

BY H. FRANKLIN PARSONS, M.D., F.G.S.

THE traveller who is gifted with an observing eye must have noticed the great difference between different parts of England as regards the abundance and luxuriance of cryptogamic vegetation. In some districts, especially near the western coasts, as Devonshire and the Lake district, every tree trunk, stone, and bank is covered with a rich drapery of green moss and hoary lichen, giving a softness and charm to the scenery, which in other districts, as our own, is lacking. In the eastern counties—and still more, in the smoke-blackened vicinity of manufacturing towns,—the tree trunks are bare, and the mosses that occur are mostly terrestrial kinds. In travelling up to London from the west, I have noticed that the moss-covered trees disappear from the scenery somewhere about the borders of Wiltshire and Berkshire. It does not necessarily follow that such districts are actually deficient in species; for instance, in our own Goole district I have found 130 species of mosses, which is as many as I found in North Somerset, where I formerly lived, although mosses were incomparably more abundant and luxuriant there than here. In the following remarks I shall take the abundance, luxuriance, and fertility of individuals, rather than the number of species met with, as the test by which to judge whether a given locality be favourable to cryptogamic vegetation or otherwise. Among the cryptogams, the more luxuriant the individual, the more likely it is as a rule to produce fruit; in the flowering plants, on the contrary, the functions of nutrition and reproduction are to some extent antagonistic.

Tree trunks appear to me to give the best criterion by which to judge whether the climate of a given district is favourable to cryptogams or otherwise, as such stations eliminate the influence of the composition and drainage of the soil, &c. All trees are not equally affected by mosses; the ash is by far the favourite, and the Goole district would be much worse off for mosses than it is, were it not that the ash is the prevailing tree. Indeed a district like ours, where mosses do not grow readily, serves to show their likes and dislikes better than one where they will grow anywhere. The stumps and trunks of hazel and hawthorn in hedgerows are also favourite situations. They are always found most luxuriant on the weather side of the tree.

The circumstances common to the whole of a district, which are favourable to the growth of mosses and lichens, are—a pure air, a moist and rainy climate, a hilly and wooded country, and a soil composed of hard ancient rocks. These conditions are generally met with in the west of England, and hence the luxuriance of cryptogams there. The Rev. W. Leighton says :—"The abundance of lichens in a fully developed and fructiferous condition is a sure and certain indication of the purity of the air and salubrity of the climate." Ferns and liverworts like similar conditions ; the latter are especially "atlantic" in their type of distribution, loving the mild moist equable atmosphere brought by the Gulf Stream to our western coasts. Club-mosses grow on mountainous moors, and horsetails in wet places and shady woods. Cryptogams love to grow

"Where things that own not man's dominion dwell,
And human foot hath ne'er or seldom been."

Both mosses and lichens, but especially the latter, shrink from man's defilements, though a few mosses, as *Tortula muralis* and *Funaria hygrometrica* may be found even close to our large towns. In suburban situations we often find tree trunks covered with a green powder, which by some botanists is considered to be an alga, and called *Chlorococcum vulgare*, and by others is thought to consist of the gonidia of lichens in a rudimentary state.

The extension of our railway system is not on the whole favourable to cryptogams, but there is one situation in which they may be frequently found—viz., the dwarf wall which supports the platform : this is out of the way of the smoke, and frequently moistened by the steam escaping from under the engine. Like the "ivy green" of which Dickens sings, they are great lovers of antiquity : an aged tree, an ancient building, or an old exposed rock, will generally be found richly covered with them. In alpine situations, however, rocks which are much exposed undergo too rapid disintegration to afford a favourable foothold to mosses and lichens, and they will consequently be found in greater plenty on the more sheltered and moister aspects.

Mountains are indeed the favourite home of mosses and lichens ; some large genera are almost confined to such situations. They extend far above the snow-line, and some lichens, as *Lecidea geographica*, may even be found on sheltered rocks at the summits of the highest Alps ; the larger lateral-fruited mosses and foliaceous lichens reach their maximum, however, in sub-alpine woods rather than in the higher mountain regions, which are more frequented by acrocarpous mosses and crustaceous lichens. Blocks transported to the plains by glacial

or human agency are sometimes the habitat of mountain mosses ; thus on the gritstone coping of an old clough at Dykemarsh, near Thorne, I have found several species of mosses which do not, to my knowledge, grow elsewhere in the district, or at least within several miles—and two at least of them (*Racomitrium lanuginosum* and *Ptychomitrium polyphyllum*) are of a decidedly mountain type, and, I suspect, have been introduced with the stones from the high moors of the west of Yorkshire.

Generally speaking, the older geological strata and the hard igneous and crystalline rocks are the most favourable to cryptogams. This is well shown at Charnwood Forest, in Leicestershire—a tract a few miles square, where the old slate and granite rocks rise to the surface in the midst of the new red sandstone plain, forming hills with jagged outline like mountains in miniature, though only 800 feet high ; these yield an abundant cryptogamic flora, including many alpine species. Dr. Lindsay says, however, that in Scotland comparatively few lichens are found on the basalt rocks. I have not seen enough of basalt rocks to confirm or disprove this statement, but on the whinstone of Teesdale and the somewhat similar serpentine at the Lizard lichens are very abundant.* In the district where I used to live, where a great range of strata occurred within a small compass, I noticed that the calcareous oolitic rocks yielded more mosses and lichens than the chalk, and the carboniferous limestone than the oolites. With sandy strata the rule does not appear to hold good ; the old red sandstone did not in Somerset yield more than the upper green sand ; and here the new red sandstone tracts are not nearly so rich in cryptogams as the alluvial sandy heaths.

The influence of the chemical composition of the soil upon the terrestrial cryptogamic flora is quite as marked as upon the flowering plants ; for instance, some kinds eschew lime, others require it ; and an old thatched roof in a calcareous district, or a limestone wall in a non-calcareous district, will often yield species not found elsewhere in the neighbourhood. The classification of soils which I believe to be best for botanical purposes, is—1. Igneo-metamorphic, as granite, slate, &c. ; 2. calcareous ; 3. clayey ; 4. sandy ; and 5. peaty, with intermediate varieties. Each of these classes of soil is marked by the presence or absence of particular species of cryptogamia ; but this is a wide subject, and I must leave it for another occasion.

* Those who have seen Mr. Brett's beautiful picture, "The Cornish Lions," in the Royal Academy Exhibition of 1878 will remember the rich orange colour of the cliffs : due to the thick tapestry of orange lichen (*Parmelia parietina*) with which they are covered.

Local conditions favourable to the growth of cryptogamic vegetation are—moisture, the presence of decaying vegetable matter, and the absence of undue competition of the higher plants. These conditions are met with on wet sandy heaths, and in moist woods, hence such places usually abound with mosses, lichens, and fungi.

Mosses and lichens, as I have said, shrivel up when dry, and revive with moisture; when dry, all vital processes are of course suspended, consequently the more frequent or constant the supply of water, the more luxuriant, *cæteris paribus*, will be the growth. The decaying vegetable matter no doubt furnishes them with an ample supply of carbonic acid. Mosses and lichens “object to smoke,” not on account of the carbonic acid, but of the sulphuric and hydrochloric acids which it contains. They will always be found much more plentiful on the roofs of farm buildings than on those of dwelling-houses; in one case they are poisoned by the soot and smoke, in the other they are nourished by the decaying dust from straw, &c., which lodges on the roof. Old thatch roofs are especially favourite places.

Mosses are usually the first vegetation which springs up on new soil, as freshly exposed rock surfaces sand and mortar, from which the seeds of other weeds are absent, and they serve an important use in such situations by forming the first thin layer of vegetable mould, in which plants of a higher grade following them can take root. The mosses which first appear in such situations are minute annual kinds, which appear in abundance the first year, but soon die out, either from requiring a fresh soil year by year, or through being stifled by the growth of more robust plants.

Some mosses exhibit tastes for which there is no accounting: thus one genus, *Splachnum*, is only found on decaying animal substances in mountainous situations; the hat of a traveller lost on the Alps has been found covered with one of these mosses. A very common moss, *Funaria hygrometrica*, loves anything that has been burnt, and is abundant on cinder paths, burnt heathy ground, brick walls, and mortar. I never but once found it on a tree, and that had been charred. These idiosyncrasies are still more marked in the case of the fungi; a great number of the smaller species have their own special pabulum, upon the presence or absence of which their occurrence depends, rather than upon geographical and climatic conditions. Many of the parasitic leaf fungi grow only on the leaves of a single species, or species belonging to one genus: the habitats of some other fungi are still more curious; thus, *Onygena equina* grows on decaying hoofs of

horses, the *Torrubiæ* on chrysalides of insects buried in the ground, *Zasmidium cellare* forms the "cobweb" on old port wine bottles, &c. A good many mosses are aquatic, but none I believe grow habitually in salt water. Some mosses, and more lichens, prefer rocks near the sea, and the common yellow lichen *Parmelia parietina* may be found growing on rocks quite down to high-water mark, and indeed (as I have seen) at a lower level than the upper limit attained by the seaweeds *Fucus serratus* and *canaliculatus*. The geographical distribution of the seaweeds will no doubt yield interesting results, but my opportunities for observing these plants have been so few, that I am unable to say anything about their favourite places of growth. The fresh-water algæ, like the fungi, depend for their occurrence chiefly upon the presence of a suitable medium. The most elegant forms are found in clear springs and mountain streamlets; these are attached and branched. The unattached filamentous confervoid species abound in stagnant waters; much sewage pollution however destroys them. Other kinds grow on damp ground, and a few are peculiar to mineral springs, as those of Bath and Harrogate.

It is an interesting question to raise, How comes it that we find special and peculiar habitats to be inhabited by special and peculiar species? Several different answers may be suggested, each of which may hold good in some instances, but not in others. In the case of the lower algæ and fungi, it is very probable that many of these peculiar species, as they appear to be, are really only forms of other commoner kinds, modified by the peculiar circumstances of their place of growth—"varietates loci." In some instances, as the alpine mosses on boulders in the plains, they may have been transported by some means from the situations in which they usually occur; in other cases they may be outliers holding their ground under special favourable circumstances amid the changed physical conditions which have altered the character of the surrounding flora. In not a few cases the answer must, I believe, be that the spores of such species (which we must remember are produced in vast numbers), are frequently present in the atmosphere, but that it is only very rarely that they happen to fall on good ground and germinate. "Spontaneous generation" and "special creation" are other answers which may be, and have been, suggested; but I have already trespassed too long upon your patience, and have neither time nor inclination to enter upon these vexed questions.

HABITS AND BREEDING OF MICRO-LEPIDOPTERA.*

BY J. H. THRELFALL.

BEFORE entering upon this subject, a few general remarks on the observation and collection of micro-lepidoptera may not be out of place. It has been objected by collectors of the larger species that the minute size and obscure habits of the micros place a too great difficulty in the way, especially of those whose time for study is limited. I venture to say that this difficulty exists principally in the minds of those who say so; and that even if it be true, that we should find in the fact itself reason sufficient for the increasing array of micro-lepidopterists throughout the country, and in no part of England are there better materials to be found for making excellent observers and manipulators than in this manufacturing district of Lancashire, where men's daily occupation compels them to think as well as labour—to use their heads in combination with their hands.

Also it is true that as the organic forms of life become smaller, they are more abundant, and whereas in the case of the Sphingidæ a few larvæ only will generally be found feeding on a single tree, a nut leaf has been known to afford sustenance to more than a dozen of *Nepticula microthenella*.

The variety of habit and manner of feeding is quite as great as amongst the Macros, and the interest of the study will not be decreased by the reasonable hope of more frequent and interesting discoveries.

The trees which yield the most prolific harvest appear to be the birch, willow, oak, and thorn; and during the months of May, July, and October the first-named in favoured localities actually swarms with larvæ feeding in the most diverse ways. Small sheltered trees or low branches near the trunk afford chosen residences for the several species of birch-feeding *Nepticulæ* and *Lithocolletes*—the former indicating their presence to the eye by narrow tracks in the leaf filled with excrement, or in a wider blotch. The larvæ may be seen by holding the leaf up towards the sky, and their operations whilst eating away the parenchyma of the leaf between the outside sheaths is extremely interesting under a lens. The large family of *Lithocolletes* feed in a somewhat similar manner, but the leaf is drawn together so as to give it a wrinkled or puckered appearance. Once having become familiar with these the smallest objects, where none are large, all difficulty with regard to size vanishes; the only one which remains is that common to

* Read before Lancashire and Cheshire Entomological Society.

the student of the larger species, viz., the invincible desire for concealment manifested by these defenceless creatures.

I well remember some years ago the length of time occupied in searching for larvæ of *Eidophasia messingiella*; although told by Mr. Hodgkinson the exact place, time, and plant on which he first discovered this insect, it was two springs before one day, whilst ruminating discontentedly on my ill luck, and meditating a final retreat, I observed a minute black bit of excrement on a leaf of *Cardamines amara*. The bud above appeared just opening to the warmth of the spring sunshine; closer scrutiny discovered a single band of silk spun from one leaf tip to another, and on pressure a light green active larva backed out and dropped into the water below. The sensations of that moment those who have succeeded after repeated disappointment will best understand; and they will also appreciate the sentiment that without difficulty there would be no pleasure in success. To attain this object of concealment, and still to carry out the double design of nature—of perpetuating their own existence and of keeping in due bounds the exuberance of vegetation—they have recourse to a variety of expedients. A simple catalogue of their mode of feeding is as follows:—In shoots; in cases; on and in seeds; in decayed wood; in webs; and as mentioned above, in mines in leaves and grasses.

Shoot feeders.—In spring, stirred by the all-powerful influence of heat, the eggs laid last summer by several families, especially of the *Gelechiidæ*, produce their inmates, which at once enclose themselves in the young and fast expanding buds sprouting from each tree and bush. Signs of their presence are not wanting in brownness of their shoots, or even by the delay in opening caused by the internal web of the larva, and in some cases by an unnatural twist so marked as to form a right angle with the stem.

In cases.—Others feed in cases of various colours, shapes, and sizes, according as the leaf out of which they are made is large or more or less thick and intensely veined. The architect is always the insect itself, and no time or labour is lost, as the sheaths of the leaf from which the parenchyma has been first stripped and eaten are at once economised. Such are *Coleophoræ*, whose habits in the perfect state are most retiring, thus forming a marked contrast to their larval state, as their presence then may be always detected by the yellow blotches, under which a case is sticking at right angles to the leaf. The *Psychidæ* are another case-bearing family, but their homes are formed from lichens or grass stems, adorned in the most singular manner by remains of beetles, flies, &c., which form a part of their food.

On seeds, many insects of various families pass the earlier stages of their existence; of such are *Coleophora Melilotella*, which bores into the husks of melilot seed and uses it as a case afterwards, adding others until it is full fed; and *Olcophora flavimaculella*, which webs together the ripe heads of *Angelica sylvestris*, and is very commonly distributed.

In decayed or sound wood, a few species feed. *C. Linneella* boring into the bark of limetrees in the south, is an example of this class. As miners in grass, mention must be made of the *Elachistæ*, on account of their interesting habit of feeding inside the blades of even the narrowest grasses, and it was a puzzle to me how the larva of *Elachista trisenatella* existed at all under the apparent pressure it underwent in the minute *Festuca ovina*. These insects also in the pupa state take up a position under a blade of grass and in the hollow side of it, and a single silken cord passed around keeps them in their place until the moment of their last transformation.

Living gregariously in webs which occasionally extend over several branches of spindle or thorn trees, the small but beautiful family of the *Ypometidæ* pursue their devastating labours unharmed by the attack of birds, and but little interrupted by attentions from the more dangerous family of ichneumons.

(To be continued.)

ON PRESERVING MOSSES.

BY C. P. HOBKIRK, F.L.S.

THE following remarks have been suggested by one of the later paragraphs in Mr. West's paper on Mosses, (*Naturalist* Vol. iv, p. 18). There may be much to recommend the process there described, but I think there are better ways of preserving mosses than the one suggested. Mr. West's method, too is open to at least one great objection: mosses when dry are very brittle, and by being kept loosely dried in paper bags, they will be seriously liable, even when carefully handled, of being broken up; leaf-tips, capsules, calyptra, in fact almost every part will be almost certainly more or less injured by being turned over in the manner suggested by Mr. West. I know from practical experience, the annoyance it is, when wishing to examine a dried specimen preserved (?) in this manner, to find scarcely a perfect leaf on a whole tuft, capsules reduced to powder, and the earthy matter which must frequently be gathered with the mosses, dusting the whole specimen and mixed up with the tufts so as

to render them perfectly useless ; with the smaller mosses such as *Seligeria*, &c., this method must eventually destroy them.

A far better method is the one I have long employed, which is a slight modification of that in practice at the Kew Herbarium, British Museum, and I believe all the large Herbaria.

The specimens when gathered, instead of being left to dry loose in the open air, should be dried in the same manner as flowering plants, between sheets of bibulous paper and not squeezed too hard. In most instances this is easy enough, as in many of the Hypnoid group, where the plants merely require to be laid flat between the sheets ; in others however which grow in dense tufts as *Didymodon*, *Tortula*, &c., or in cushions as *Grimmia*, before putting them in the press, I take a sharp long-bladed knife, and cut the cushion or tuft into thin sections right through its length ; in this manner a fair idea of the habit of growth of the plant is conveyed, and it is thin enough to be pressed without being crushed out of shape. In *Dicranum* and other genera where the tufts are loosely coherent they may be separated into little bundles for drying, which will equally preserve the habits of them.

When the specimens are dried ready for the herbarium, take a sheet (double) of foolscap or other convenient size, and of moderate stoutness, and write the name of the genus and species (with a reference number) either on the top or bottom left hand corner ; on the inner (third) page, a number of small pockets may be gummed, made of various sizes to suit the size of the specimen, and into each pocket specimens from *one* locality only should be placed, and either on the pocket itself, or immediately below or above it, write the name of the gatherer, the locality, date, &c., or if the specimen have been sent ready dried with a ticket along with it containing these details, gum on the ticket instead. The sheet should contain only one species, but if more specimens are obtained than would fill the sheet, another half sheet of same size may be easily placed inside with more pockets of specimens. Each species being thus placed within a separate sheet, the sheets should then be all placed inside a somewhat larger and stronger coloured sheet, with the name of the genus written outside at a similar corner to the specific name of the inside sheet. The sheets of genera may then be placed in their several families, as shown in the Lond. Cat. of Brit. Mosses ; each family being placed in a sheet which will entirely cover it up, both ends and sides, to keep out dust, &c., and tied round with tape, which is much better than string, as it lies flat and does not cut. The name and number of the family should then be written large (in same corner)

outside these sheets, with a list of genera contained in it, and a convenient number of these family groups may then be placed between two sheets of millboard, and tied down to keep them from rubbing.

I need not dilate on the advantages of this method, a little thought will indicate them to any student. It may take up a little more time, but it is well worth it, and if once adopted will not readily be changed—at least I think so. As it would not be easy to write out a method of making the pockets named, I shall be glad to send a specimen of them to any one who may desire it, along with any other information required, on receipt of a stamped envelope.

Huddersfield, 26th Sept., 1878.

Short Notes and Queries.

Falco peregrinus.—A beautiful specimen of the above bird was shot at Gunby, eight miles from here, on Saturday last, Oct. 5th, and is now in the hands of Mr. Joseph Pulleyn, bird stuffer, Selby.—T. FOSTER, Selby, Oct. 10, 1878.

LATE SUMMER MIGRANTS.—On Monday, Oct. 7th, I saw two swallows hawking over the canal basin at Salterhebble; same day I saw a house-martin's nest containing young ones, in the same neighbourhood. On Monday, Oct. 14th, a brood of house martens flew from a nest in Eli Crossley's window at Elland. I saw them the day before.—C. C. HANSON, Stainland.

ORNITHOLOGICAL NOTES : LEEDS, 1878.—That rare and interesting little bird, the grasshopper warbler (*Salicaria locustella*) was found breeding rather plentifully with us last spring; I have found several nests containing either eggs or young. Another was reported as having been found in the same locality, which contained five eggs, one of which I was so fortunate as to obtain. The nests were constructed chiefly of dried grass, loosely put together, and were concealed in small evergreens. They were all in the vicinity of water. I also found a nest, containing eggs, of the grey wagtail (*Motacilla boarula*) on Adel Moor. I am glad to say that this bird, which is somewhat rare in this district, reared its young in safety. The hooded crow (*Corvus cornix*) was reported to have bred near Gledhow last spring. The reporter, on whose authority I can safely rely, caught the bird while faithfully fulfilling the duties of incubation. This is worthy of special notice, as the hooded crow seldom breeds inland, preferring the cliffs of the sea-coast, where its nest is placed on a ledge of rock or on some stunted tree which presents a favourable site for its construction. It seldom breeds in England, though not uncommon with us in winter, but in the north of Scotland it is a permanent resident

throughout the year. Several large flocks of swallows were observed on the 4th October and for several preceding weeks, flying south-eastwards. It has been very interesting to watch them collecting together in the vicinity of the river Aire, preparatory to their migratory flight to a warmer climate, to return no more until next spring. Mr. John Grassham tells me that he noticed small parties of swallows, perhaps three or four in number, at Gledhow, on the 13th instant. Kingfishers and dippers have again returned to their favourite haunts at Roundhay Park, where formerly they bred along with other and still rarer birds. No doubt they would still do so, were they not disturbed by the public.—WALTER RAINE, 5, Leeds Terrace. North-street, Leeds, Oct. 14th, 1878.

Acherontia Atropos AT GOOLE.—Mr. Bunker, of Goole, informs me that an unusual number of the death's-head hawk moth (*Acherontia Atropos*) has occurred in the district. Mr. B. possessed two specimens, and reports five or six others. Such a quantity I believe merits notice.—S. D. BAIRSTOW, Woodland Mount, Huddersfield, 7th Oct., 1878.

Cynophallus caninus IN S. W. YORKSHIRE.—I see *Cynophallus caninus* reported as new to West Yorkshire in your October issue. Having had specimens brought me from two localities near York, namely, Buttercrambe in 1877, Tilmire Sept. 28th, 1878, it seems worth while to mention the fact, in case it should be fresh also to this district.—J. EDMUND CLARK, B.A., B. Sc. F.G.S., 20, Bootham, York, Oct. 1st.

Seligeria tristicha IN ENGLAND.—In answer to Mr. Wesley's enquiry about my having detected the above moss at Castleton, I beg to inform him that I have every reason to believe that the statement in Schimper's Synopsis is a mistake, as I have no knowledge of having gathered it anywhere before I gathered it in Yorkshire in June last. I may also add that I know of several other gross errors with reference to personal authorities in Schimper's Synopsis, which in my opinion render an otherwise valuable work very unreliable. I have made two special journeys to Castleton this year, but I have only found *Seligeria pusilla* and *Anodus Donnianus*. Myself and Mr. Ashton found the moss (*S. tristicha*) on shady dripping limestone rocks near Litton, Yorkshire, on the 15th of June, 1878. On the same rock we also gathered *Seligeria pusilla* and *S. recurvata*.—J. WHITEHEAD.

Is *Seligeria tristicha* NEW TO ENGLAND OR NOT?—As I recorded the discovery of Mr. Whitehead's Littondale moss as "new" to England in August, perhaps I may as well reply to the query on page 39 of last month's number. The drift of the query is to show the inaccuracy of the words "new to England." When I wrote them, however, I did so on the best possible authority, viz., that of Mr. Whitehead himself! I quoted his own statement—a remarkable one if he had previously found it in Derbyshire. In Mr. Whitehead's letter (written last July), asking me to verify and notice his discovery, he himself says, "A moss not only new

to Yorkshire, but I believe new to England." So, then, Mr. Whitehead was, last July, unaware of any Castleton locality, and if he had found the moss before, it is inconceivable that he should have forgotten so rare a fact in regard to so characteristic a moss. Prof. Schimper may have detected *S. tristicha* amongst some other moss sent, unknowingly, from Castleton by Mr. Whitehead, but it is curious that his name should be quoted when he, the quoted one, knows nothing of it.—F. ARNOLD LEES, F.L.S.

NOTICES OF BOOKS, &c.

"Transactions of the Watford Natural History Society and Hertfordshire Field Club."—Vol. II., Pt. 1.—This part contains, amongst others, an interesting paper on the Birds of the District, by J. E. Littleboy, with some further notes; on the Birds of Hitchin, by James H. Luke; and a Report on Phenological Observations in the County, by Jno. Hopkinson, F.L.S. The list of the times of flowering observed includes 45 plants, and there are a few records of the appearance of some insects and birds.

"The Natural History Journal (York)," Vol. II., No. 7: Dr. H. F. Parsons, F.G.S., contributes Part iv. of Flowerless Plants; Mosses—with an outline plate; J. H. Salter, a paper on the Birds of the Yorkshire Coast; and F. A. Knight on Bird Stuffing. There are also meteorological, botanical, zoological, &c., notes from various parts of the country.

Rainfall for September.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 3·02	16	25·48	* 23·52	15	0·77
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	3·79	9	...	...	14	1·15
HALIFAX... (F. G. S. Rawson)	360	5·20	15	33·78	41·90	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	†	...	...	...	...	...
BARNLEY ... (T. Lister) ...	350	2·21	13	20·18	27·37	29	0·66
INGBIRCHWORTH (do.)	853	3·73	16	30·10	36·72	15	0·70
WENTWORTH CASTLE (do.)...	520	2·07	13	20·84	30·28	30	0·89
GOOLE ... (H. F. Parsons) ...	25	2·44	15	17·40	21·70	30	0·45

* This is the average to date for 12 years, 1866-77. † No Returns.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting October 1st.—The first lecture of the series proposed to be given monthly was delivered by the president, Mr. T. Lister, on "Spring Migrants." The observations of birds up to the present date not yet reported in the *Naturalist* are : latest record made to us of departing migrants are, Sept. 7, swift and young whinchat, seen by Dr. Payne ; 15th, sand martin ; 24th, willow wren noted, but Mr. Talbot reported this and sand-martin Oct. 7th ; Oct. 2nd, the wheatear, seen by G. Scholey : 16th, swallows and martins yet seen at Monk Bretton Abbey ; some pairs have had two or three broods. I heard the redstart sing so late as Sept. 13, a later date than I have known. Of rarer birds seen were crossbills at Darfield, Sept. 10th ; a flock of 25 wild geese at Stainborough Park, on the 15th Sept. and some days afterwards ; also Canada geese on the pools. Carrion crows, scarce here, noted on the 21st and 28th ; 15 herons seen by Dr. Payne at Colwick, and several by Mr. C. Wemyss, Cannon Hall Park. Oct. 3, fifty gulls were seen flying to south-west ; 11th, one tern seen at Smithies Water Works.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Oct. 1st, Mr. Illingworth in the chair.—Several members gave descriptive accounts of their recent natural history rambles. Mr. Carter showed *H. protea* and *A. aprilina* from Hawksworth, also *D. ceruleocephala* from Goole ; he also shewed, on behalf of Mr. Butterfield, *N. Dahlii* from Cottingley, and *A. agathina* from Harden Moor—both new to the district record list ; Mr. West *Gnaphalium sylvaticum*, *Polypodium Dryopteris*, and *P. phegopteris* from between Baildon and Meuston, some fronds of *P. phegopteris* measuring 24 inches with the stipes.

MEETING, Oct. 15th, Mr. Illingworth in the chair.—Mr. Spence read a paper on the spiracles of insects, profusely illustrated by microscopical preparations diagrams and the blackboard. Mr. Carter shewed, on behalf of Messrs. E. P. P. and J. A. Butterfield, *Orthosia lota* and *macilenta*—both new to the district record list ; Mr. Hopwood, *Agrotis suffusa* from the Bradford district.—WM. WEST, Sec.

GOOLE SCIENTIFIC SOCIETY.—The last excursion of the present year was made Sept. 20th, to Haxey, in the Isle of Axholme. The main body of the party left Goole by the 12-52 train, arriving at half-past two at Haxey station, where they were met by the Rev. W. Fowler, who had previously been over the ground about Laughton, Ferry Flash and Owston, and by some other members who had gone by an earlier train to Stainforth, and walked across Hatfield Moor and by Wroot to Haxey. The party then walked to Haxey village, and thence to Skier's Flash and "the turfery," a strip of unreclaimed wet, sandy, and peaty ground where many interesting plants occur. Haxey itself, a large straggling village, is situate on a low hill, standing out of the fenny plain like an island out of

water, which indeed the name, "Isle of Axholme," shows that it has once actually been. The hill is composed of the variegated red and green marl of the triassic series, but covered up first by a gravel made up of fragments of the marl, and above that by a bed of yellow alluvial sand. Islets of new red sandstone, capped as usual with a gravel bed, occur at Hatfield, Hatfield Woodhouse, and Wroot. The alluvial strata, which form the flat ground between these hillocks, are similar to those about Goole; the warp, however, is only found near the Trent, and west of Haxey the peat is the uppermost bed, hence the surface soil in the fields is black, as in the fen district of Cambridgeshire. On Hatfield Moor the peat bed attains a great depth, as on Thorne Waste. The forest bed is found under the peat on Hatfield Moor, and as far at least as Haxey; the remains of many large trees were seen in the ditches. Under the peat are sand and laminated clay, as at Goole. In one place near Haxey the loose sand was blown by the wind into a hillock, like the dunes on the coast. The fen land is drained by large dykes which run in pairs, the water in the two being at different levels, the low level dyke is for the drainage of such lands as lie too low to get a natural outfall, and the water has to be lifted by engines at pumping stations. Owing partly to the wide extent of ground covered during the day, in spite of the lateness of the season, a large number of plants were observed, several being of very uncommon kinds; the total number of flowering plants was 308, considerably more than at any previous excursion of the society. The flora of Hatfield Moor closely resembled that of Thorne Waste, with which it was no doubt formerly continuous. The white beak-sedge and the Andromeda, so characteristic of the Goole moors, occurred there, but only the common species of sundew were seen. The flora of the turfery at Haxey more resembled that of Riccall Common, though differing by the presence of some species and the absence of others. Among the more interesting plants found during the excursion were *Cladium mariscus*, a large sedgy plant with tough saw-like leaves; *Peucedanum palustre*, now becoming very scarce through the drainage of the fen districts; and *Utricularia vulgaris*, an aquatic plant with finely-cut leaves, buoyed up in the water by a number of air bladders. A good many mosses and fungi were seen. Four or five well-marked brambles were plentifully met with, and it was noticed that the fruit of each "species" or "variety"—whichever it may be called of this puzzled genus of plants—possessed a distinct and easily-recognised flavour. Few birds were seen during the day, and nothing was done in the other branches of zoology.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting October 11th, Mr. G. T. Porritt, president, in the chair.—Mr. C. P. Hobkirk exhibited *Dicranella squarrosa* and *Oligotrichum hercynicum*, from Harden Moss Wood—two mosses new to the locality; Mr. George Brook ter., a series of slides prepared by Rev. W. Vize, of the species and varieties of *Sphagnum*, from Dr. Braithwaite's monograph of the genus; Part ii. of Mosley's

“Varieties of Lepidoptera,” and the current number of his “Exotic Butterflies” were on the table: in both cases the plates were beautifully executed. The chairman read a paper entitled “A Fortnight in the Fens,” in which he gave the results of a recent collecting expedition to Wicken, in company with the Rev. T. W. Daltry, M.A., of Madeley Vicarage.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting Sept. 30th, Mr. S. J. Capper, president, in the chair. A paper was read by Mr. Ellis on “Darwinism: its relation to Entomology.” The president, in his remarks on the paper, stated he had just received from the author, Mr. H. Goss, F.L.S., F.G.S., a work which he held in his hand, entitled “The Insect Fauna of the Recent and Tertiary Periods.” Mr. Goss invited the attention of geologists to the importance of an acquaintance with the insect fauna of former times; the study of their remains, he considered, was of the greatest value in assisting at the arrival of just conclusions as to the geological condition of the earth in past ages. The president drew attention to the second part, just published, of Mr. Mosley’s *Illustrations of Lepidoptera Varieties*, and congratulated the members that out of 17 figured, six of the originals were in the possession of members of the society. Several exhibits were made, amongst which were—by Mr. Ellis, two live specimens of genus *Blatta*; Mr. West, three lively pupæ of *A. atropos*, found a few miles from Liverpool.

LEEDS NATURALISTS’ CLUB AND SCIENTIFIC ASSOCIATION.—307th meeting, Sept. 17th, Mr. Samuel Jefferson, F.C.S., v.p., in the chair.—Paper read by Mr. Thomas Hick, B.A., B. Sc., on “The Sexual Reproduction of Fungi.” Donations of a specimen of *Acherontia atropos*, taken near Wetherby for the local collection, and of two-and-a-half volumes of the *Entomologists’ Monthly Magazine* for the library, presented by Mr. J. S. Wesley, were acknowledged by a hearty vote of thanks.

308TH MEETING, Sept. 24th, Mr. B. Holgate, F.G.S., v.p., in the chair.—Donations to the library, including a paper on “Mosses,” by Mr. Wm. West, were acknowledged by vote of thanks. Mr. Walter Raine showed the eggs of the Egyptian vulture, peregrine falcon, osprey, hobby, merlin, red-footed falcon, kite, and buzzard; Mr. Washington Teasdale, a new histological microscope, by Parkes of Birmingham, also specimens of microscopic ruling on glass, chiefly geometric and compound vibration curves; Mr. Saynor, *Volvox globator*, mounted in glycerine three years ago, now in good condition and colour.

309TH MEETING, Oct. 1st, Mr. Hy. Pocklington, F.R.M.S., president, in the chair.—A paper was read, written by Mr. Jno. Emmet, on “Some remains of a Roman Villa at Dalton Parlours, near Collingham, discovered in 1854,” and illustrated by specimens of the various objects found, and numerous drawings.

310TH MEETING, Oct. 8th, the president in the chair.—A further donation to the library from Mr. Wesley (Morris's Naturalist, 19 numbers), was acknowledged by vote of thanks. Mr. Walter Raine brought eggs of the collared pratincole, ruff, dunlin, oystercatcher, and varieties of those of the curlew, common snipe, and thick-kneed plover. Eggs of other birds were shown by Mr. Henry Marsh, and common shells from Lincolnshire by Mr. C. H. Bothamley. Mr. W. E. Clarke showed Yorkshire specimens of the knot and sanderling, and made some interesting remarks on their occurrence in the arctic regions. In microscopy Mr. Saynor showed scalariform tissue of fern, cornea of dragon-fly, section of coal and polycistine; Mr. F. W. Edwards, cuticles of tea, ivy, bean, &c., and diatoms (Cocconeis); Mr. James Abbot, sections of eyes of lobster and dragon-fly; Mr. W. Barwell Turner, parasites of beetle, bee, goose, fowl, partridge, heron, tortoise, bat, boar, man, &c., fresh-water algæ (*Draperia naldia plumosa*, *Batrachospermum moniliforme*, *Cladophora glomerata*, *Micrasterias rotata*, *Volvox* and *Vaucheria*), and marine algæ (*Ceramium acanthonatum*, *Dasya coccinea*, *Callithamnion roseum*, and *Mesogloia Griffithsiana*); Mr. Emsley, sections of stems of *Equisetum*, willow, *Solanum*, &c. Entomological exhibits were made by various members.

311TH MEETING, Mr. Edward Thompson in the chair.—Mr. William Howgate, V.P., read a paper upon "Natural Objects used as Symbols in the Arts."—WM. DENISON ROEBUCK, Sec.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, 7th October, at Burwood, the president in the chair. The following specimens were put on the table by Messrs. Edwards and Hanson:—*Lamium purpureum*, *Humulus lupulus*, *Medicago maculata*, *Narthecium ossifragum*, &c.; by Mr. S. Peel, a blue mountain parrot.—W. H. SROTT, Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Oct. 9th, Mr. M. Smith in the chair.—Mr. G. Bacon exhibited a specimen of the kittiwake (*Larus tridactylus*), killed with a boat hook near Lendal Bridge, on the 20th September last, also egg of the same; Mr. Ripley, a splendid variety of the grouse (*Tetrao Scoticus*), the coloration of feathers being lightish grey and spotted with dark brown; a specimen also of that very rare bird the solitary snipe, shot by Mr. W. Rudston Read, at Hayton, near Pocklington, which will be added to the Read collection in the York Museum; a male merlin (*Falco aesalon*), shot near Acomb by Capt. Lees, on the 27th of September; a pied land-rail (*Gallinula crex*), shot near York; and a buff-coloured variety of the greenfinch (*Fringilla chloris*), shot at Londesboro'; Mr. Postill, *Scotosia dubitata* and *flavicincta*; the hon. secretary, Mr. Prest, a long and fine series of varieties of *Cidaria immanata*, taken in several localities near York and in Sherwood Forest; three curious forms of *Bombyx callunæ*, bred at Leeds; a long series of *Thera firmaria*, taken last month near York; *Nonagria Hellmanii* from Wicken Fen, taken by Mr. Porritt; bred specimens of *Tethea retusa*, and a series of *Agrophila sulphuratis*.

Diary.—Meetings of Societies.

- Nov. 1. Heckmondwike Juvenile Naturalists'.
" 5. Huddersfield Literary and Scientific Society, Gilchrist Lecture in Armoury, R. A. Proctor, F.R.S., on "The Sun," 8 p.m.—Bishop Auckland Naturalists' Club.—Liversedge Naturalists'.—Leeds Naturalists' Club, &c.
" 8. Huddersfield Scientific Club, 8 p.m., Paper by Geo. Brook, ter.
" 9. Heckmondwike Naturalists', 7-30 p.m.
" 11. Huddersfield Naturalists', Paper: "Additions to the Insect Fauna of Yorkshire," S. L. Mosley, 8 p.m.
" 12. Leeds Naturalists' Club, &c., Paper: "Gun Cotton," J. A. Douglas, F.M.S., of Bradford.
" 13. York and District Naturalists' Field Club.
" 19. Huddersfield Literary and Scientific Society, Gilchrist Lecture in Armoury, Prof. Williamson, F.R.S., on "Coal and Coal Plants," 8 p.m.—Leeds Naturalists' Club, &c.
" 21. North Staffordshire Naturalists' Field Club, Meeting at Hanley.
" 23. Huddersfield Naturalists'.
" 25. Lancashire and Cheshire Entomological Society.
" 26. Leeds Naturalists' Club, &c.
" 29. Heckmondwike Juvenile Naturalists'.

Papers received from Messrs. J. D. Butterell, Rev. R. Wood, M.A., Henry Crowther, &c.

EXCHANGE.

DUPLICATES: Edusa, Selene, Paphia, Athalia, Sibylla, Quercus, Tuorella, Vespertaria, Fumata, Variata, Dilutata, Albicillata, Duplaris, Diluta, Furva, Suffusa, Porphyrea, Lucernea, Glareosa, Subtusa, Fulvago, Aprilina, Rufina, Macilenta, Pistacina, Spadicea, Exoleta, Purpuralis. DESIDERATA: Varieties of Grossulariata, or any common species, also local specimens of Tortrices.—W. Prest, Holgate Road, York,

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No. XLI.

DECEMBER, 1878.

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Original Articles.

HABITS AND BREEDING OF MICRO-LEPIDOPTERA.

BY J. H. THRELFALL.

(Concluded.)

It is a little curious to observe that those larvæ which feed the most exposed in sunlight should engross so little of the notice of these their most determined enemies. It may be on account of their slightly hairy appearance, or perhaps it may be surmised that hidden and poisonous qualities exist, against the use of which Nature has placed the unerring guide of instinct.

Having thus noticed in a very sketchy manner some of the more general modes of feeding pursued by the micro-lepidoptera, it will next be advisable in a few words to say what is the best plan of saving their life, and eventually in a state of artificial confinement to produce from the immature stages of larva and pupa the more perfect and beautiful form of the imago. And in this, as in other sciences in which Nature is our teacher, it will be found best to follow her example as closely as possible, and to preserve in temperature, in moisture, and in exclusion of all causes of disturbance, those conditions which are the most favourable in a wild state; here will be the difficulty to all except those who have plenty of room, good air, and light. For in every instance where a new larva is met with, to make sure of bringing it to its perfect state it will be found the best to take the plant on which it feeds, and let all grow together in a flower-pot, over which glass or gauze should be placed to prevent escape. In this way I have eight larvæ of *Coleophora Wockeella* feeding on *Betonica officinalis*; they are exposed in the garden, and at one time during the winter the pot was completely covered with a drift of snow. Of course only rare larvæ need be treated this way, as the others may be bred with less risk of a good result in other ways. In the case of trees such as the oak being the food-plant, small twigs placed in a bottle and kept in a cool place out of doors, will be found to answer. The *Coleophoræ* are so difficult to rear in any other way, that it is by far the best to adopt one of these plans, and not to trust to those mentioned later.

For the shoot-feeders, if care be taken to slightly dry the leaves, a fair proportion of insects may be bred by placing the larvæ in jam pots or flower pots whose rims have been rubbed level to admit of their being covered by a closely-fitting piece of glass. These should be looked at every day, and shaken up so that damp and mould may be kept at a distance, as these are the greatest dangers to guard against.

All the *Psychidæ* and *Coleophoræ* require light and air, so that with them gauze should be used instead of glass ; and in some cases of seed feeders which hibernate, it is a good plan to place them in bags with the food-plant, and hang them out of doors all winter out of the way of rats and mice. But the way of breeding which appears to be almost peculiar to the small fry is one used by all the old collectors, and which was strongly recommended to me by Mr. Sang, of Darlington, who has prosecuted the method most successfully. He uses tubes of glass about 6in. long by 1½in. wide, such as the chimney of an argand lamp, places the larvæ with the leaf inside rolled up in very soft paper, and corks up both ends. The leaves must not be wet, nor must the tubes be left in the sun, but in a cool place out of doors, and the difficulty to be solved is to keep away either mould or excessive dryness. This last plan is especially suited to the most minute forms, such as the *Lithocelletes* and *Nepticulæ*, which complete their larval existence on a single leaf, and when full-fed spin an oval cocoon of various colours on the paper.

And here it may be useful to repeat a remark which the same gentleman made to me that the summer brood of larvæ—viz., those feeding in June and July—never produce a tithe of imagos, and had better be left entirely alone, as in autumn they appear again, and can then be kept and bred successfully. In spring also avoid tin boxes as permanent cages, although they serve very well as temporary prisons whilst away in the country.

These are some of the ways, and will probably be already known to many, of breeding the micro-lepidoptera. They are used also in breeding the macros, and in mentioning them I can only plead the old but valid excuse of wishing to arouse, or to fan into bright flame, that earnest interest in the secrets of nature which makes the recollections of our past life happy, and may produce in the future, discoveries which shall benefit the distant generations of men. For Nature allows to size no priority ; her works, whether in the shape of distant suns or minute organisms such as the Bacteria of Tyndall, are of equal value and importance.

Neglecting nothing, but observing everything, let each man join the ever-increasing army of workers, determined to push on to the best of his ability that glorious time when ignorance shall be the exception, when to see shall be to know : thus fulfilling the undying though ancient dream of poets and philosophers when peace and plenty shall be permanent, and the nations shall rejoice in wealth more precious and exhaustless than the far-famed land of gold.

Preston, 1878.

SPECIMEN FLORÆ CUMBRIÆ,

OR

A CENTURY OF CUMBERLAND PLANTS NOT RECORDED FOR THE COUNTY
IN TOPOGRAPHICAL BOTANY, YET KNOWN FOR IT BY
ONE OR OTHER OF THE AUTHORITIES CITED.

BY REV. R. WOOD, M.A.

REVISED AND ANNOTATED BY F. A. LEES, F.L.S.

NOTE.—Stations without italic initial following rest on R. Wood's authority. (*M*)—Manuscript Flora of County, as yet unpublished. (*D*)—W. Dickenson, a Workington botanist. (*H*)—J. Hodgson, Schoolmaster, late of Whitehaven. The marks † and * after the specific name imply it to be doubtfully or certainly alien, respectively.

DICOTYLEDONS.

- Thalictrum flavum*, var. *sphaerocarpum*. Dalston.
Myosurus minimus. Wigton.
Ranunculus fluitans. In river Eamont, (*H*).
R. Baudotii. Kirkbride.
R. Lenormandi. Thrapland.
Papaver Rhoeas, et *dubium*. Westward.
P. Argemone. Low-house, Wigton,
Meconopsis Cambrica. Westdale, (*D*), “?” in *Top. Bot*.
Hesperis matronalis. † By river Ellen, (*H*).
Cheiranthus Cheiri. * Scaleby Castle Walls, (*D*).
Arabis petroea. The Scree, (*M*). “?” *Top. Bot.* ¹
Alyssum calycinum. * Silloth ballast.
Reseda lutea * Silloth, but on the ballast heaps.
Viola odorata. Stockdale-Wath, seeming wild. ²
Dianthus deltoides. Forest of Skiddaw, (*M*).
Saponaria officinalis. † Derwent-side, (*D*).
Silene noctiflora. * Silloth, a casual.
Cerastium semidecandrum. Westward.
C. alpinum. Helvellyn, (*M*). ³
C. arvense. Near Whitehaven, (*D*).
Sagina apetala. By the Solway.
Spergularia marina (*neglecta*). Saltcoates.
Claytonia perfoliata. * Frizington, (*H*).

(1.) And I think rightly queried until the station can be made to rest upon the unimpeachable basis of a specimen.—F. A. L.

(2.) But of course only *seeming*.—F. A. L.

(3.) I believe the exact station is Striding Edge, and that is just within the county boundary of Westmoreland.—F. A. L.

- Malva rotundifolia*. Dundraw.
Geranium phœum. Westward, an escape.
Rhamnus catharticus. Ullock Moss. ⁴
Ononis spinosa. Westward.
Melilotus alba.* Silloth, a casual.
M. officinalis.* Kirkland.
Trigonella ornithopodioides. Workington, (D). ⁵
Lathyrus palustris. Marsh near Whitehaven.
Poterium Sanguisorba. Westward.
Potentilla procumbens. Aspatria.
Pimpinella magna. Kedburngill, (D).
Oenanthe fistulosa. Allonby.
Peucedanum Ostruthium. † By Ullswater, (H).
Galium tricarne. Brookfield, (M). “? error” *Top. Bot.*
Carduus nutans. Westward.
Centaurea Cyanus. † Westward, a casual.
Anthemis nobilis. Pap-Castle, Cockermouth, (D). ⁶
Artemisia Absinthium.* Dalston.
Senecio erucifolius. Gt. Broughton, (D). “?” in *Top. Bot.*
S. saracenicus.* Sebergham.
Erigeron acris. The Green, Dalston.
Taraxacum erythrospermum. Silloth.
Campanula Rapunculus,* et *rapunculoides*.* Westward. Escapes.
Pyrola “*rotundifolia*.” Wallow Crag, Keswick, (D). ⁷
Cuscuta Trifolii.* Westward, a casual.
C. europæa.* As a casual, Greysouthern, (D)
Verbascum nigrum.* Westward, a casual.
Linaria repens. Buckabank, (H).
L. minor. Brigham, (H).
Veronica Buxbaumii. † Brackenthwaite.
Rhinanthus major, Ehrh. Culton, near Wigton.
Mentha rotundifolia.* et *viridis*.* By Ullswater, (H).
Organum vulgare. Near Ullswater (H).

(4.) A curious station for a plant usually of dry calcareous soils. Perhaps the marsh- or bog-loving *R. Frangula* was meant.—F. A. L.

(5.) Already recorded once, but Mr. Watson holds it reported “on insufficient authority.” Perhaps it is a casual; it occurs now and then as such near seaports, brought by ballast; and inland, gets accidentally sown with grass seeds often.—F. A. L.

(6.) Doubtless a stray from the Castle gardens.—F. A. L.

(7.) With Mr. Watson I believe this to be *P. media*. That does occur near Keswick and Ambleside; and the three species of *Pyrola* are often confounded.—F. A. L.

- Leonurus Cardiaca*. * Old Carlisle, near Wigton.
Lamium amplexicaule. Gerard House.
Symphytum officinale. Dalston. ? introduced.
Asperugo procumbens. * On Silloth ballast.
Anagallis cærulea. Heusingham, (D).
Chenopodium olidum. Saltcoates.
Asarum europæum. † Hutton Woods, (M).
Salix purpurea. Egremont, (D).

MONOCOTYLEDONS.

- Cephalanthera ensifolia*. Abbey-Holme. ⁸
Colchicum autumnale. Baggrow.
Butomus umbellatus. Near Kirkbride.
Zannichellia palustris. In the river Ellen, (D).
Potamogeton densus. Do. do.
P. pectinatus. Bassenthwaite Lake, (D).
Luzula "spicata." Blake-Fell, (D). ⁹
Juncus maritimus. Kirkbride.
Carex disticha. Westward.
C. Bönninghauseniana! Eskatt, near Whitehaven, (H).
C. "elongata." Snellings-mire, (D). ¹⁰
C. "strigosa." Near Crofton, (D). ¹¹
C. stricta, Good. Biglands, (M). ¹²
C. flava, *var. lepidocarpa*. Coldbeck.
C. paludosa. Thursby.
Phleum arenarium. Silloth.
Glyceria aquatica. Dubmill.
Sclerochloa maritima. Saltcoates.
S. rigida. Silloth.
Cynosurus echinatus. * Brackenthwaite, a casual.
Festuca sciuroides. Westward.
Bromus erectus. Arlecdon, (D).
B. arvensis. * Silloth, a casual.
Triticum eu-junceum, et *acutum*. Silloth Sands.
Lolium temulentum. Westward.

(8.) The *C. grandiflora* of *Top. Bot.* given for this county is, I believe, really this—the narrow-leaved species—as in Argyleshire. It extends furthest north in Britain.—F. A. L.

(9.) Very doubtful. Blake-fell is only a minor elevation, and hitherto in Britain this arctic species has not been seen to descend below 2,800 feet—F. A. L.

(10, 11, and 12.) All these three names require further certification that the nomenclature is correct. I have seen no specimens.—F. A. L.

- Elymus arenarius*. Mawbray, (M). " ? " *Top. Bot.*
Hordeum murinum. Flimby. (M). do.
Chara flexilis. Murton Moss, (D).
C. foetida. Near Caldbeck.
C. hispida. Harris Moor, (D).

Westward Vicarage, Oct. 1st, 1878.

LIST OF THE LAND AND FRESH WATER MOLLUSCA OF HULL AND VICINITY.

By J. D. BUTTERELL.

THE following list, which is the result of several seasons' collecting, must not be considered as an absolutely exhaustive one, and further research will no doubt add some of the numerous varieties, as well perhaps as such species as *Ancylus fluviatilis*, *Helix rufescens*, and *Cochlicopa tridens*, at present conspicuous by their absence.

The district explored is chiefly the low-lying country in the immediate neighbourhood of Hull, with some places in Holderness; Hessle, Brough, Brantingham, Welton and Skidby, which are situated on the chalk on a range of hills bounding the district on the west. The river Hull, several canals, and numerous wide drains supply a home for the aquatic species. Leven canal, commencing at Leven, runs through a dark soil of somewhat peaty texture for a distance of three miles, and joins the Hull near Beverley. The Barmston drain, which begins at Barmston, between Hornsea and Bridlington, traverses the county in a south-west direction, going through Beverley to Hull; where quoted, the part within three miles of Hull is generally alluded to. Spring Dyke (which is so prolific in individuals that its surface is in some parts quite brown with numbers of *Planorbis spirorbis*) runs from the waterworks at Springhead to Hull.

LIST OF SHELLS TAKEN NEAR HULL AND IN HOLDERNESS.

- Sphærium corneum*. Barmston and Skidby drains, Brantingham, plentiful.
S. lacustre. Spring Dyke, specimens rather small, whitish and semi-transparent.
Pisidium amnicum. Barmston Drain, Leven Canal.
P. fontinale, *var. Henslowana*. Leven Canal.
P. pusillum. Leven Canal and Keyingham Drain.

- P. nitidum*. Common, Spring Dyke, Skidby Drain, and Keyingham Drain.
- Anodonta cygnea*. Risby Park pond, Hornsea Mere; empty shells in Leven Canal and Barmston Drain; rather fine at Risby.
- A. anatina*. Hornsea Mere.
- Neritina fluviatilis*. Barmston Drain.
- Bythinia tentaculata*. Common in almost every pond and ditch in the district.
- B. Leachii*. Barmston Drain.
- Hydrobia ventrosa*. Very plentiful in drains near the Humber, between Brough and Market Weighton Canal.
- Valvata piscinalis*. Skidby Drain, Leven Canal.
- V. cristata*. Attached to caddis-cases in Leven Canal.
- Planorbis nautilus*. Pond near Springhead.
- P. nautilus*, *var. cristata*. Do.
- P. albus*. Welton Dale, Leven Canal.
- P. spirorbis*. Common; in some parts of Spring Dyke the water is quite brown with their floating shells.
- P. vortex*. Not so common as the last species: Spring Dyke, Beverley, Brantingham.
- P. carinatus*. Beverley, Leven Canal.
- P. complanatus*. Common.
- P. corneus*. Generally distributed; very plentiful in Spring Dyke.
- P. contortus*. Found with the last.
- Physa hypnorum*. Anlaby Road, Beverley Road.
- P. fontinalis*. Common.
- Lymnæa peregra*. Very common; fine in a pond at the entrance to Welton Dale, and in Leven Canal.
- L. stagnalis*. Beverley, Cottingham Road; fine in Spring Dyke.
- L. palustris*. Spring Dyke, Beverley, Hornsea.
- L. truncatula*. Barmston Drain; Hessle—in stagnant water in a lime quarry, fine; Brantingham.
- L. truncatula*, *var. minor*. Hessle Road.
- Ancylus lacustris*. Leven Canal.
- Arion ater*. Very common.
- A. hortensis*. do.
- Limax Sowerbyi* (?) In gardens, Hull.
- L. flavus*. Hornsea.
- L. agrestis*. Very common.
- L. maximus*. Common in Hull gardens; Hornsea.
- Succinea putris*. Very common.

- S. putris* *var. vitrea*. Banks of Barmston Drain.
Vitrina pellucida. Generally distributed.
Zonites cellarius. Common; fine at Hessle.
Z. alliaris. Hessle, Skidby, Risby.
Z. nitidulus. Alnaby Road, Hessle, Welton, Keyingham.
Z. purus. Hessle, Skidby, Welton, Withernsea.
Z. radiatulus. Banks of Barmston Drain.
Z. nitidus. Banks of Barmston Drain; Hornsea.
Z. crystallinus. Pretty generally distributed.
Z. fulvus. Welton, Skidby, Banks of Barmston Drain.
Helix aspersa. Common.
H. nemoralis. Very common, shell straw colour, with white bands, at Brough.
H. nemoralis, var. hortensis. Skidby, Beverley.
H. nemoralis, var. hybrida. Beverley Road, Anlaby Road, Spring head.
H. arbustorum. Hessle, Beverley, Skidby, Brough.
H. arbustorum, var. flavescens. Near Brough.
H. cantiana. Common.
H. hispida. Very common.
H. hispida, var. albida. Banks of Spring Dyke.
H. hispida, var. subrufa. Keyingham.
H. virgata. Hessle, Anlaby Road, Welton Road to Springhead, Hornsea.
H. caperata. Hessle, Skidby, Welton, Keyingham.
H. caperata, var. ornata, Picard. Welton Dale.
H. ericetorum. Skidby, Keyingham very plentiful, Welton.
H. rotundata. Hessle, Skidby, Risby.
H. rotundata, var. alba. Hessle.
H. pulchella. Hessle, Beverley, Skidby, Welton.
H. pulchella, var. costata. Skidby, Welton.
Bulimus obscurus. Hessle, Welton.
Pupa umbilicata. Hessle, Risby.
P. marginata. Road to Springhead, on chalk laid to support sleepers; wall near Welton.
C. rugosa. Hessle, Welton, Skidby.
C. laminata. Skidby.
C. lubrica. Common.
Achatina acicula. Dead shells at Hessle, Welton and Skidby, scarce.
Carychium minimum. Common in suitable localities; very abundant at Skidby.

WHITBY.

BY HENRY CROWTHER.

WHITBY, the Streonshalh (the town on the strand) of the Saxons, offers many agreeable changes to the inland naturalist, archæologist, or even ordinary sightseer. Approached by one of the most beautiful dales in Yorkshire—the vale of Pickering—on the one side, and by the sea on the other, one can indulge on the one hand in admiring the precipitous limestone escarpments, the pleasant blendings of moor and cultivable lands, interrupted and enlivened by extensive woods of larch and oak, at the foot of which meanders the Mark Esk; or can view if sailing, from the south especially, an extension of Yorkshire coast scenery which for interest, particularly zoological, has perhaps no county equal. But it is to the all-round zoologist, a student who is becoming commoner every day—one who, though he may have no great desire to become a specialist, has a craving to witness, alive if possible, types which form often the connecting links in the animal kingdom, of which the sea is the repository of the major portion,—that I commend this quiet, romantic, and interesting little seaport.

Situate where the river Esk joins the sea, with high cliffs rising nearly 200 feet above high water, the principal receptacle of St. Hilda's exorcised and lapidified snakes, composed of the upper alum shale, &c., on the east side, which disappearing through a line of fault, dips under the harbour, and reappearing at the little village of Sandsend, some three miles westward, gives us on the west of the river a sandstone cliff somewhat under 100 feet high, having at its base an excellent expanse of sandy beach. At the base of the high east cliff, which is capped with the Abbey and the Parish Church, is an extensive scar of liassic rock, on the face of which are visible innumerable *Ammonitidæ*, *Belemnitidæ*, *Ledæ*, &c. The geology of Whitby being proverbial, almost all visitors become students—too often, unfortunately, wantonly practical ones, for, armed with hammer, whatever they see in the form of a fossil on the scar has inflicted upon it such summary chastisement as to render its specific recognition a question of fancy. The ladies are especially guilty, the *modus operandi* being to hit away at the object so that it will jump out of the matrix, and the result achieved in nine-tenths of the cases is something about which they care so much that they throw it away, and then (to use their own words) “look for something better.”

The scar discloses, when the tide is low, rock pools of varying sizes, miniature sea gardens and marine aquaria, lined with red and green

seaweeds, and dotted with *Actinœ*, especially *crassicornis* and *mesembryanthemum*. Extending about a mile the scar reaches Saltwick Nab, a liassic promontory (and island at high tide) where the adjoining cliff is very low, due to the establishment formerly of alum works. The East Pier on the east, the Nab on the west, on the south the precipitous cliff, and the sea stretching away to the north, form boundaries to a rich hunting ground. To an earnest worker in zoology within and about these precincts is to be reaped a rich harvest. On Saltwick Nab, where some tea gardens are established, are two ponds of fresh water, which at high water can be but few feet above its level; near the end of one being, when we were there, a fishing coble drawn up out of the reach of the waves. Yet, flavoured as the water must inevitably be with salty spray, *Limnœa peregra* is to be found crawling about by hundreds, and though their size is small they do not compare unfavourably with their congeners in another pool which caps the cliff at least 100 feet higher, a little beyond the footpath which leads from the cliff to the Nab. Here also were taken *Dytiscus marginalis* (fem.), *Ilybius ater*, and *Gyrinus bicolor*, the latter beetle, like the molluscs, swarming. Descending we find that *Ammonitidæ* and *Belemnitidæ* abound, and that *Leda ovum* is specially abundant, and continues so to the western end of the limit we are considering.

Searching amongst these rocky pools on the lovely morning succeeding the awfully stormy day Sept. 12th, when nine vessels were wrecked, and Whitby beheld the stormiest day she remembered for ten years past, and which we partly felt as we returned from a fishing smack,—we found marine animals of great interest, numbers of dead jelly-fish, *Cyaneæ*, *Thaumantiæ*, and occasionally a specimen of *Cydippe pileus*, which is plentiful off the coast: of sea-urchins, *Amphidotus cordatus* and *Echinus sphæra*.

(To be continued.)

Short Notes and Queries.

LITTLE AUK AT MICKLEFIELD, NEAR LEEDS.—One of these rare little birds was shot on the 9th of this month, at Micklefield, and was brought to Mr. Wardman to be stuffed, in whose possession it was seen by Mr. Grassham and myself.—WALTER H. HAY, Leeds, Nov. 12th.

***Dicranum scoparium*, var. *rupestre*, IN YORKSHIRE.**—The moss given as *Dicranum falcatum* in the report of the Wharnccliffe meeting of the Yorkshire Naturalists' Union, has been submitted to Messrs. Hobkirk and Boswell, and is pronounced to be *D. scoparium*, var. *rupestre*. This

variety is not given in Schimper's Synopsis, but is, so far as at present known, an American form. It differs from the common form in its small size, dark green colour, densely pulvinate habit, and strongly falcate leaves. Habitat: sandstone rocks, Wharfedale Crags.—H. F. PARSONS.

A NEW BRITISH MOSS (*Aulacomnion turgidum*).—Perhaps it will interest the readers of the *Naturalist* to hear of the discovery of *Aulacomnion turgidum* in the Breadalbane mountains. This moss was gathered so far back as 1871 by Prof. Barker, of Owen's College, but had laid neglected in his herbarium until a few weeks back. Only barren specimens were found, but according to Schimper it has been found with good fruit in Norway and Lapland.—JNO. WHITEHEAD, Dukinfield.—[Is it correct that this moss has been found in Yorkshire?—*Eds. Nat.*]

Seligeria tristicha AT CASTLETON.—With reference to the occurrence of *Seligeria tristicha* at Castleton, I recollect gathering a small barren moss on wet limestone rocks, ten years ago, at the above locality. I took the specimens to Dr. Wood, of Manchester, and he told me it was *Trichostomum tophaceum*, but perhaps he afterwards sent it to Dr. Schimper, and he thought it was *Seligeria tristicha*.—J. WHITEHEAD.—[This may account for Schimper's statement.—*Eds. Nat.*]

COLEOPTERA OF W. COAST OF N. AMERICA.—Mr. O'N. Sandford of San Diego, California, sends us a priced list of the coleoptera found by him on these coasts, which are either for sale or exchange. We shall be glad to lend the same to any of our readers who wish it, for a few days each, on receipt of stamped cover.—*Eds. Nat.*

Obituary.—THOMAS W. WONFOR, F.L.S.—This gentleman, whose name has long been familiar to all naturalists, more especially to those resident in Sussex, died at 38, Buckingham Place, Brighton, on Sunday, the 20th October last, in the fifty-first year of his age. Mr. WONFOR's entry on a public career in Brighton was made in connection with the Royal Literary and Scientific Institution, at the Albion Rooms, where he frequently lectured. A year or two after the formation of the Brighton and Sussex Natural History Society in 1853, Mr. WONFOR was appointed an honorary secretary—a post which he occupied until the date of his death, and in the discharge of the duties of which he exhibited very great ability and energy. It was as a microscopist that Mr. WONFOR chiefly distinguished himself; and one of his papers "On certain Butterfly Scales characteristic of Sex," read at Brighton in November, 1867, was subsequently published in the eighth vol. of the *Microscopical Journal*. Besides his very numerous papers on microscopical subjects in the Proceedings of the Brighton and Sussex Natural History Society, Mr. WONFOR contributed a great number of papers on almost every branch of zoology and botany, not only to the Proceedings of his own Society, but to those of other Natural History Societies in Sussex, and to various periodicals.

When in 1872 the British Association visited Brighton, Mr. WONFOR took a very active part in their proceedings, and acted as secretary to one of the committees. Mr. WONFOR was appointed Curator of the Brighton Free Library and Museum in 1875; he was elected a Fellow of the Linnean Society in June, 1877, and a Member of the Entomological Society of London in February last. He was also an Honorary or Corresponding Member of several Natural History and Microscopical Societies in various parts of the United Kingdom.—H. Goss.

Rainfall for October.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson) ...	Ft. 350	In. 3·07	17	28·55	* 26·98	10-21	0·59
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	†	...	...	...	...	...
HALIFAX... (F. G. S. Rawson)	360	5·30	13	39·80	48·85	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	†	...	...	...	...	...
BARNSELY ... (T. Lister) ...	350	1·99	18	22·17	29·90	24	0·44
INGBIRCHWORTH (do.)	853	3·55	18	33·65	40·64	21	0·65
WENTWORTH CASTLE (do.)...	520	2·46	18	23·30	33·50	24	0·65
GOOLE ... (H. F. Parsons) ...	25	2·45	18	19·85	23·19	24	0·43

* This is the average to date for 12 years, 1866-77. † No Returns.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting November 13th, T. Lister, president, in the chair.—Mr. A. Kell, C.E., exhibited a fine case of eggs of British birds, commencing with birds of prey from the griffin vulture to the buzzards; he accompanied this with a description of each egg, and a brief account of each bird, intending to continue the series throughout the British birds, of which he has nearly a complete collection of eggs. Some observations on birds were made by the president, of which a summary is given. The summer warblers were, with some exceptions, silent or not visible in the early part of autumn; the main body appeared to have winged their flight to southern countries; the returning milder weather caused some to stay beyond their usual time; of these not

reported in the October *Naturalist* are the wood warbler, Sep. 10th ; the spotted crake reported by W. Talbot, near Hiendly, Sep. 13th, two more killed by telegraph wire ; the spotted fly-catcher, Sep. 22nd ; the yellow wagtail, Sep. 29th ; the whitethroat, Oct. 7th ; the ring-ousel, Oct. 16th ; the land-rail, Oct. 20 ; a swallow seen near Carr House, Masborough, Nov. 7th, another obtained by W. Talbot, on the Calder, Nov. 13th ; he queries if we remember one so late. I reply, no—but a brood of martins were seen by me, Nov. 11th, a few years back at Pinder Oaks, Barnsley, some of which would stay a few days before finally starting southwards. Of winter visitants we have the following records : the jack snipe, Sep. 13th, the grey wagtail, 16th : the fieldfares and redwings, Oct. 9th ; the brambling, Oct. 15th ; the mountain-linnet, Oct. 19th. Of rarer birds we have had the haw-finch, Oct. 4th, sparrow-hawk dashing at partridges, seen Oct. 15th, creepers, gold-crests, cole and long-tailed tits, Oct. 25th. Flocks of from 12 to 50 wild geese and ducks, many gulls, have passed over Barnsley district throughout the autumn months ; kestrels, herons, black-spotted woodpeckers, kingfishers, sandpipers, have been frequently observed in the district.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting October 29th, the president in the chair.—Mr. H. Hebblethwaite read a paper on “Denudation.” The paper showed what an influence water has had in forming the general contour of the country, various parts of the country being described in illustration. Mr. West showed *Lithostrotion basaltiforme* from Settle, *Dryas octopetala*, *Draba incana*, *Asplenium viride*, *Polypodium Robertianum*, and *Sesleria cœrulea*, from Arncliffe, the latter plant being in flower as it is found in April. Mr. Carter exhibited on behalf of Messrs. Butterfield, *O. suspecta* and *Acidalia subsericeata*, from Cottingley ; and Mr. Starling, *C. Haworthii* from Rombald's Moor—all three new to the district record list.

MEETING Nov. 12th, the president in the chair.—Mr. Soppit gave a paper on “A Flower.” He described minutely all the organs of a flower, with their functions, dwelling especially on fertilization. A long and animated discussion followed.—WM. WEST, Sec.

GOOLE SCIENTIFIC SOCIETY.—The winter session commenced on Oct. 19th, with a soiree. Addresses were given by the Revs. W. Fowler and J. Spink ; the latter exhibited the telephone, microphone, and electric light. A series of views were exhibited with the magic lantern by Mr. J. S. Harrison, of Hull. The specimens exhibited comprised fossils, insects, birds' eggs, dried plants, microscopes and slides, and a collection of fungi gathered the previous day in the woods near Skipwith, among which were *Agaricus phalloides*, *A. granulatus*, *A. sculpturatus*, *A. luridus*, *A. phyllophilus*, *A. variabilis*, *A. tener* and *A. sublateritius*, *Lactarius cilicioides*, *L. vellereus* and *L. deliciosus*, *Russula alutacea*, *Cortinarius tabularis*, *C. cinnamomeus* and *C. collinitus*, *Panus conchatus* (Selby),

Boletus badius, *B. edulis* and *B. granulatus*, *Polyporus perennis*, *P. annosus*, *P. velutinus* and *P. vaporarius*, *Craterellus sinuosus*, *Thelaphora laciniata*, *Clavaria inaequalis*, *Calocera viscosa*, and *Peziza eruginosa*. The museum of the society was declared open : it is at present in its infancy, but contains, among other objects, a herbarium of above 400 local species of flowering plants, a collection of the land and fresh-water mollusks of the neighbourhood, fossils, and a collection of articles of commerce imported into Goole, presented by the Aire and Calder Navigation Co. A microscope has been purchased for the use of the society.

MEETING, Nov. 1st.—Lecture by S. Drew, M.D., D. Sc. F.R.S. Ed., “The Earth and her Sister Planets.”—H. FRANKLIN PARSONS.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting November 11th, Mr. G. T. Porritt, president, in the chair.—Mr. C. P. Hobkirk exhibited *Sphagnum acutifolium*, var. *late-virens*, and *Sphagnum molle*, var. *Muelleri*, from Darnholme, near Whitby, sent to him by Dr. Braithwaite. The chairman shewed a series of *Emmelesia teniata*, taken during the present season near Grange by Mr. J. B. Hodgkinson of Preston ; he also stated that Mr. Grigg had taken specimens of *Platypteryx sicula* near Bristol again this year. Part VII. of Mosley’s “Exotic Butterflies” was on the table, and was greatly appreciated. The secretary, Mr. George Brook, ter., read a paper entitled “A Botanist’s Trip to Killarney,” in which he gave the results of an expedition to that district made by himself and Mr. James Britten in August last. He exhibited a large number of specimens he had collected, including *Euphrasia viscosa* from Cork ; *Ulex Gallii*, Bray Head ; *Hypericum elodes*, *Ceterach officinalis*, *Cicendia filiformis*, *Pinguicula lusitanica*, *Drosera intermedia*, *Campylopus atrovirens*, *Ptychomitrium polyphyllum*, and *Racomitrium canescens*, fr., all from Glengariff ; *Saponaria officinalis*, from near Bray ; *Scutellaria minor*, *Rhynchospora fusca* from Killarney ; *Veronica scutellata*, Kerry ; *Hypericum androsaemum*, *Festuca ovina*, var. *vivipara*, from Muckcross ; *Campylopus fragilis*, var. *densus*, *Pogonatum urnigerum*, *P. aloides*, *Euphorbia hiberna*, *Racomitrium aciculare*, *Hymenophyllum Wilsoni*, all from Mangerton ; *Ulotrichum calvescens*, Torc Waterfall ; *Ranunculus Lenormandi*, *Sedum anglicum*, *Anagallis tenella*, *Arbutus unedo*, all Gap of Dunloe ; *Callitriche autumnalis*, *Nymphaea alba*, *Silene maritima*, *Epipactis media*, *Vicia sylvatica*, all Ross Island ; *Lycium barbarum*, Sutton Station ; *Hypericum humifusum*, Bray Head ; *Lotus corniculatus*, var. *crassifolius*, from Greystones ; *Feniculum officinale*, Dargle ; *Anthemis nobilis*, Greystones.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—This society held its monthly meeting Oct. 28th, in the small lecture room, Brown’s Museum, Mr. S. J. Capper, president, in the chair. A paper was read by Mr. Henry Capper on “Ants.” The president exhibited two interesting specimens of a *Cidaria* from the Isle of Arran, considered varieties of *Cidaria russata* ; Mr. Hodgkinson, of Preston, *C. reticulata*, *E. teniata*, a new tortrix (*Penthina postrema*), also varieties of *A. grossulariata*,

B. repandata, &c. ; Mr. Johnson, pupa and imago of *C. bifida* ; Mr. Whitby, *Sphinx convolvuli* ; Mr. Ellis, several varieties of *T. hastiana*, &c.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—312th meeting, October 22nd, Mr. B. Holgate, F.G.S., v.p., in the chair.—Microscopical objects were principally shown, including sections of *Ruscus aculeatus*, *Castanea vesca*, &c., and other objects, by Mr. F. W. Edwards, and by Mr. W. B. Turner various marine algæ—*Polysiphonia*, *Ptilota*, *Callithamnion*, *Enteromorpha*, *Ulva*, and *Cladophora*—from the Yorkshire coast. Insects were also shown.

313TH MEETING, October 29th, Mr. Wm. Howgate, v.p., in the chair. Paper read : “On the Progress of Popular Scientific Instruction in Russia,” by Mr. Edwd. E. Prince.

314TH MEETING, November 5th, Mr. John Grassham in the chair.—Numerous insects and micro-slides shown ; sections of oak and willow by Mr. Saynor ; “discoid” diatoms by Mr. Turner—*Craspedodiscus*, *Arachnodiscus*, *Aulacodiscus*,—also *Triceratium* and *Terpsinoë* ; also by Mr. Turner, dichromatic slides of ruby silver and platino-cyanide of magnesium ; by Mr. F. Emsley, sections of *Solanum dulcamara*, buckthorn, &c., a leg of female *Dytiscus marginalis* ; by Mr. Washington Teasdale, two slides of Lissajou's curves, stained longitudinal section of hand of foetus, also of jaw of mole, cuticle of fuchsia-leaf, double-stained transverse section of frond of *Platycerium alcicorne*, spiral cells of *Oncidium*, section of spine of *Echinometra*, and sulphate of nickel and potash. He also showed a very adaptable little spectroscope by Adam Hillger, of London. Other objects by Mr. F. W. Edwards. A short note on Halifax birds by Mr. F. G. S. Rawson was read ; he reported the nesting of the wood warbler during the summer, a bird of which he had previously had some doubts ; in August he shot a scoter ; wild geese and ducks passed over the district the latter end of September ; swallows generally departed last week in September, but Mr. Rawson observed four or five on October 12th, the last noted ; and at the date of writing (Oct. 22nd) fieldfares and redwings had arrived in large numbers. At this meeting the society's Yorkshire Herbarium received a very welcome addition, for which thanks were voted, in the form of 38 species of plants given by Mr. W. West of Bradford, most of them new to the collection.

315TH MEETING, Nov. 12th, Mr. C. H. Bothamley in the chair.—Paper read, and illustrated by samples, “Gun Cotton,” by Mr. J. A. Douglas, F.M.S., of Bradford.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—A meeting of gentlemen interested in the study of cryptogamic botany was recently held in the library of the Lower Mossley Street Schools, for the purpose of forming a Society which shall bear the above title. There were present a number of well-known botanists from Ashton-under-Lyne, Oldham, and other towns in the district, and the Society was formally established upon a basis which

will, no doubt, be durable and satisfactory. Mr. John Whitehead (Dukinfield) was unanimously chosen as the president; Mr. Thomas Brittain and Mr. W. H. Pearson were elected vice-presidents; and Mr. T. Rogers honorary secretary and treasurer. Other resolutions were adopted, defining the objects of the Society and providing for its efficient administration, and a committee was appointed with instructions to prepare a code of rules for adoption, or otherwise, at the next meeting. This preliminary work having been completed, several rare mosses were exhibited and named by the president, amongst others one only recently known as belonging to Britain, namely *Aulacomnion turgidum*, found by Professor Barker, of Owen's College, in Breadalbane.

STAINLAND NATURALISTS' SOCIETY.—Meeting Nov. 4th, the president in the chair.—Mr. E. Garside exhibited a short-eared owl, shot in the neighbourhood, and a pair of Australian parroquets.—W. H. STORT.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Nov. 7th, the president, Mr. J. Wainwright, F.L.S., in the chair.—Mr. Spurling exhibited 21 species of micro-lepidoptera including *pyralites*, *tortricina*, and *tineæ*. Mr. Sims, *S. lunaria*, *S. illustraria*, *E. cervinaria*, *C. spartiata*, and *C. nupta*. Mr. A. Marshall, *P. cardui*. Mr. Talbot, spotted crake, *Crex porzana*, shot on the banks of the reservoir at Cold-Hiendly, Sep. 13th. Mr. E. E. Talbot, *Acherontia Atropos* taken at Wakefield Asylum, Oct. 15th, and given to him by Mr. Smith. The president read a paper on Coniferae, illustrated with 15 cones of the trees under consideration.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting Nov. 13th, Mr. T. L. Smith in the chair.—The following specimens were exhibited by Mr. Sharpe: eggs of the hedge sparrow (*Accentor modularis*) and yellow hammer (*Emberiza citrinella*), both of which were not more than half the usual size. Mr. G. Bacon: eggs of the capercaillie (*Tetrao urogallus*), the ptarmigan (*Tetrao lagopus*), and the red grouse (*Tetrao scoticus*), of the latter three splendid varieties. Mr. Helstrip: a specimen of that very rare bird, the spotted sandpiper (*Totanus macularius*), shot near Heslington. Mr. Wm. Simmons: a box of tortrices and tineæ, amongst them being some fine varieties of *Sarrothripa revayana*, *Depressaria nanatella* and *carduella*, *lappella*, *magnificella*, *subochicella*, *Gregonella*, *lineolea*, &c., &c.; also preserved larvæ of *hippocastanaria*, finely mounted on its food plant. The secretary, Mr. Prest: a large case of insects recently got in exchange; amongst them were a fine series of *Lithosia quadra*, *Orygia gonostigma* (both bred), *Acidalia contiguaria*, *Corycia laminata*, *Eupithecia debiliata*, a large and fine series of *Cidaria psittacata*, *Catocola promissa*, and *Galleria cerella*; also a large box of insects recently taken at Sandburn, near York, amongst them being three specimens of *Agrotis saucia*, a very rare species in this district, and the larvæ of *Eupithecia castigata* and *trisinata*, preserved and mounted by Lord Walsingham, in his usual natural style.—W. PREST.

Diary.—Meetings of Societies.

- Dec. 3. Leeds Naturalists' Club, &c., Annual Meeting.—Bishop Auckland Naturalists' Club.—Liversedge Naturalists'.—Huddersfield Literary and Scientific Society, Gilchrist Lecture; Prof. W. Boyd Dawkins, F.R.S., "Our Earliest Ancestors in Britain."
- " 7. Heckmondwike Naturalists'.
- " 9. Huddersfield Naturalists'.
- " 10. Barnsley Naturalist'.
- " 11. York and District Naturalists' Field Club, Paper: "A week's collecting in Sherwood Forest," W. Prest.
- " 13. Goole Scientific, Reports of Recorders, &c.
- " 17. Huddersfield Literary and Scientific Society, Gilchrist Lecture; "The Gulf Stream: What it does, and what it does not," Dr. W. B. Carpenter, F.R.S.
- " 21. Huddersfield Naturalists'.
- " 26. Barnsley Naturalists'.
- " 27. Heckmondwike Juvenile Naturalists'.
- " 30. Lancashire and Cheshire Entomological Society.

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No. XLII.

JANUARY, 1879.

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Fig. 1

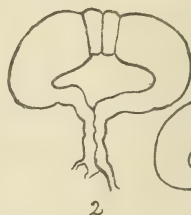


Fig. II.

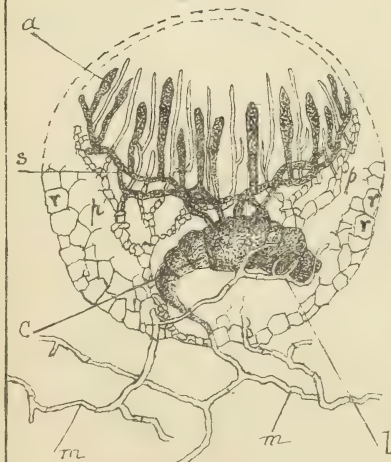


Fig. III

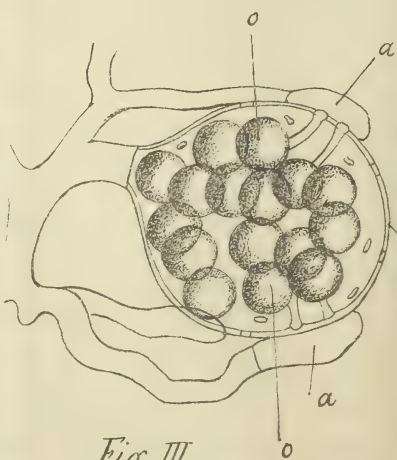


Fig. III.

Original Articles.

W H I T B Y.

BY HENRY CROWTHER.

(Concluded.)

THE torn-up seaweeds entangled the bodies of hundreds of star-fish, and the pools yielded the common sun-star, *Solaster papposa*, specimens having the full complement of fifteen rays not being rare; the purple sun-star *S. endeca*; the eyed cribella, *Cribella oculata*; lesser sand-star, *Ophiura albida*; and the common cross-fish, *Uraster rubens*, of which there are large quantities, chiefly noticeable at low water at the harbour's mouth, crawling over the mussel beds which occur at the foot of each pier. Amongst the *Crustacea* the palm for numbers most certainly was earned by the *Idoteadæ*, which have the appearance of so many aquatic wood-lice, and are distinguished by having feet armed with pointed claws, and possessing two simple folding plates beneath the abdomen; shrimps (*Crangon vulgaris*), small specimens of the great crab, *Cancer pagurus*; the dwarf swimming crab, *Portunus pusillus*; one representative of the masked crab, *Corystes Cassive-launus* (male); amongst mussels the pea-crab, *Pinnotheres pisum*; and lastly, but not the least interesting, the hermit crab, *Pagurus Bernhardus*, in possession of shell-houses of all sizes from *Nassa pygmaea* to *Buccinum undatum*, and plentiful.

Nineteen species of recent mollusca, exclusive of varieties, which are often the species of some author or other, were obtained. *Purpura lapillus* and *Patella vulgata* were so numerous that they covered yards of rock surface. The latter should be well scrutinised, for at no time can types and their deviations be compared so advantageously as when an almost inexhaustible number may be examined; in this case the varieties *elevata*, *picta*, and *cærulea* were taken, on the fronds of seaweed *Helcion pellucidum* and its variety *lævis*. This mollusc is easily found by searching the food-plant.

Much has been said about the depressions formed on rock surfaces by the continual returning to the same place of *P. vulgata*; as illustrative of the same thing, we may add that in our possession is a piece of seaweed stalk in which is embedded a specimen of *H. pellucidum* so deeply as to bring the apex of its shell on a level with the outer surface of the stalk. These rock depressions, although occurring, are not as noticeable here as those seen by us at one or two places on the east coast of Ireland, particularly about Howth. Whilst examining these, a specimen of *Tectura testudinalis* attracted our attention, and a good search resulted in eight or ten examples. Twice were seen

Patellæ and *Tecturæ* in shallow basins of sea-water, crawling as if the bright rays of the sun torrifed them, from which it was evident that the *Patellæ* travel much quicker, and cause the shell to oscillate somewhat. *Chiton cinereus* occurs about loose stones sparingly, *Littorina rudis*, *L. obtusata*, and *L. littorea* are well represented, some of the latter being large. Both *Trochus cinerarius* and *T. lineatus* occur; amongst the former are distributed forms varying from the flattest to the most conical, due to the zones it inhabits.

Whilst searching for these in one of the pools, we noticed a commotion amongst these and several other molluscs which was of too brisk a nature for their well-known and characteristic slowness. When the obscuring sand which they had thrown up in the fray had settled, we saw that the shells were principally in possession of hermit crabs, which under this guise were attacking a *Purpura lapillus* and dragging it from its shell. We caught the whole school at once and transferred them to a collecting-bag; the shells occupied were *Nassa pygmaea*, *Trochus cinereus*, *Littorina littorea*, three sizes, and a *P. lapillus*, the sheik of the party, for he was taken red-handed. We presume to think that if their object had not been frustrated, there would have been ere long a mutual exchange of crab's clothing.

On the west cliff, and thence towards Sandsend, we searched for land shells, taking *Helix caperata* and excellent specimens of the var. *ornata* as abundantly as the type; *H. pulchella* and its var. *costata* rarely. *H. sericea* two taken; *H. virgata*, *H. rotundata*, *H. nemoralis*, *Cochlicopa lubrica* and the var. *lubricoides*, *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*, *Z. crystallinus*, and the following coleoptera:—*Badister bipustulatus*, *Pterostichus erythropus*, *Crepidodera salicariæ*, *Apion pisi*, and *Chrysomela staphylæa*.

A walk over Sneaton Moor to Falling Foss in Little Beck, six miles from Whitby, will repay the sightseer in scenery, or the collector of coleoptera, hymenoptera, or lepidoptera. The conchologist finds so little that it is useless looking, but of the former order we took *Cicindela campestris*, the tiger beetle (which occurs not uncommonly), *Geotrupes stercorarius*, *G. sylvaticus*, and near a larch wood, *G. vernalis*, *Carabus catenulatus*, *Quedius cruentus*, *Aphodius contaminatus*, and several common forms.

At Robin Hood's Bay is another rich hunting ground, on the outskirts of which the following beetles were added:—*Bembidium laterale*, *Olisthopus rotundatus*, and *Anchomenus albipes*; in a small horse-trough, *L. peregra*, the shell not large, but possessing a somewhat straight marginal mouth; nothing beyond *Z. purus* was added to our list of

land and fresh-water shells. The beach and the base of the cliffs will repay a careful search. At Hawsker, on our way to the bay, we took in a large pond the var. *ovata* of *L. peregra*, apparently the sole occupant, as not another mollusc could be found.

On the way to Ruswarp, a pretty little village on the Esk, and somewhere about one mile from Whitby, we took the following fresh shells:—*Pupa umbilicata* plentifully, *Succinea putris*, *Limnæa truncatula*, and *Clausilia rugosa* rarely. The coleoptera were almost as elsewhere, the additions being *Aphodius rufipes*, *Bembidium æneum*, *Notiophilus semipunctatus*, and *Agriotes sputator*; on our return, *Helix hortensis*. At the locality where the latter was taken are found both *H. nemoralis* and *hybrida* the variety. The three taken in conjunction at once point to the beautiful pink-lipped hybrid form being an offspring of the dark-lipped *nemoralis* and the white-lipped *hortensis*. From other observations made elsewhere this year on the same point, we are fully convinced that these two are the progenitors of the aptly-named *hybrida*. *Limax flavus* is abundant at Bagdale, on the outskirts of Whitby.

The river Esk (Celtic for water) yields *Unio margaritifer*, the pearl-bearing mussel, a specimen of which, particularly to the Yorkshire conchologist, is a desideratum. The gift of a specimen gave us the desire to take it for ourselves. A return ticket was taken to Egton Bridge, and we worked our way up Glaisdale towards Lealholm Bridge. A careful search from point to point disclosed at last an indubious sign in the form of a piece of the black epidermis appertaining to this species. Here we began to work. A net is useless; the best, in fact the only way to be successful is to take off shoes and stockings, roll up the trousers as far as possible—fastening them with straps is advantageous—and go into the stream. A stout stick is necessary for support, as the stones are rough, and a step at times making a difference of a few inches or as many feet of water. At last one was found, and an hour's searching brought several to light, and two hours more raised the total to over twenty. We were not successful every time we essayed, but learned that they abound mostly about two feet from the sides, under bushes, and in shallow water. The whole of the specimens were embedded three-quarters of their length in mud, sand, and gravel, a good pull usually being required to extract them. Doubtless it is to this latter fact that is due the decomposition which obtains on the umboes, as from their oblique position having the anterior end buried, the ventral edge uppermost, with a gape of about three-eighths of an inch displaying the edges of the mantle, and the posterior end well pointed up stream, the umbonal region when the shell reclines thus, must rest in the deepest

stratum, which is apparent every time a specimen is withdrawn to be black mud. Some of the older shells—subject, there is no doubt, to years of this lazy, quiet life,—are very deeply corroded, oftentimes two-thirds the thickness of the shell. Some, too, had attached to them young living specimens of *L. peregra* and *Ancylus fluviatilis*. The var. *sinuata* occurs sparingly. Compared with typical shells taken out of the river Dhoe, Isle of Man, the whole series taken are somewhat sinuous. We searched on cleaning, for pearls, dreaming not to take gems, but desiring to realise for ourselves their occurrence, and we were successful, if finding four distorted partly spherical pieces of nacre can be called pearls. Two were about one-eighth of an inch in diameter, and the others half that size; one was found laid within the shell as if held in position by the exterior surface of the mantle. The other three were taken from one exceedingly old specimen, and were attached,—embedded would be the better word, strange as it may seem, and still does to us,—on the right posterior adductor muscle.

The scenery of Glaisdale is most beautiful; the dale, Egton Bridge, and Arncliffe Woods, exclusive of the conchological treasures, would repay the visitor. Whilst returning towards the woods we took but two species of land shells, *H. hispida* and *H. rotundata*; but in coleoptera, besides *Philonthus intermedius*, we fortunately captured two exceedingly small specimens of *Anchomenus prasinus*; we are as yet unable to find any special mention being made of this variety. Compared with the type, it is but half size.

One word more. Knowing that the easy-chair naturalist, callous to the charms of personal collecting, asks, when he reads articles dealing thus with nature—"Has anything fresh been tendered, and what is its use?" we feel tempted to answer; but as he deems only his own cribbed effusions valuable, we leave him to ruminate upon them, and turn to those of our own way of thinking, whose name is legion, and aptly say, here is partly sketched a locality rich enough to repay careful working, for, from a fourteen days' stay we have put forth the fullest record of the occurrence and other particulars concerning *H. margaritifera* as found in our Yorkshire Esk; given prominence to a probably new variety amongst the despised, because so common, *Anchomenus prasinus*; we next claim to be the first to publish the occurrence of *Tectura testudinalis* in Yorkshire; that it is indigenous in our county is therefore settled, and its southern limit extended from Hartlepool somewhere near forty miles, and if from a dead shell found by us in Robin Hood's Bay we may venture to predict its being found there, that limit must be extended six miles more. Again, we claim still another record. Hitherto the fact

that the hermit crab destroyed the living mollusc so that it might appropriate its shell, has rested upon the testimony of trustworthy fishermen : we deem ourselves fortunate in having seen it, learning this latter fact but a few days ago ; and lastly, we feel we have fulfilled a duty in giving this exposition of the charms of a place situate in our own county. With Pliny we exclaim—" Verily, for mine own part, the more I looke into Nature's workes, the sooner am I induced to beleeeve of her even those things that seem incredible."

The Museum, Leeds, Oct. 18th, 1878.

OBSERVATIONS CONCERNING THREE NEW WEST YORKSHIRE MOSSES.

BY F. ARNOLD LEES, F.L.S.

I HAVE pleasure in reporting the discovery of three new mosses, two of them new to Britain—in a sense at least, since their names do not appear in any catalogue of British mosses as yet published. They are *Orthotrichum rupestre*, Schleich. ; *Aulacomnium turgidum*, Schpr. ; and *Fontinalis gracilis*, Lindb. Let us consider them seriatim.

I. *Orthotrichum rupestre*, Schleich. Until last month this ranked as an *incognit* in the MS. moss flora of the Riding now in course of composition by the printers, since the only record was one of Dr. Carrington's, and that admittedly doubtful, viz : " I think I collected one tuft near Ingleborough in 1857 !" for the plant recorded in Baines' Flora of 1840 as *rupestre* from near Bolton Bridge, was afterwards ascertained to be a form of *O. saxatile*, Brid., then known as *O. anomalum* of Bry. Brit. In August last, however, Mr. W. West and myself made an excursion to Whernside for the purpose of investigating the altitudinal range of our sub-alpine mosses, and amongst the mosses we found this *O. rupestre* occurred. Mr. H. Boswell has verified the name. It was growing on high exposed rocks at about 2,300 to 2400 feet (*i.e.* the summit ridge), with *Racomitrium heterostichum* var. *alopecurum*.

II. *Aulacomnium turgidum*, Schimp.—This moss was one of the fifty notable species gathered by Mr. West and myself on Whernside, in the excursion already alluded to. We did not recognise it at the time—indeed we gathered only one tuft of it (matted with *Sphagnum papillosum*), and that, as nearly as I can recollect, on the north-east slope of the mountain, ascending the shoulder by Great Blake Gill from Dentedale head. I remember picking it, and saying to my companion, "*Aulacomnium palustre* and *Sphagnum rigidum*," and he acquiescing, the tuft was

consigned to the common bag (carried by West, in which fact I rejoiced, as it grew very heavy before we'd done!) which held our gatherings. It was not recognised until I sent Mr. Boswell a sample of several of the things we had found. With regard to the aspect of the slope where found, it is a curious coincidence—unknown to me until the Rev. J. Fergusson remarked upon it—that Prof. Barker's Ben More moss, gathered seven years ago, was also found on the north-eastern side of the mountain, the aspect upon which spores blown from Iceland or Norway would be most likely to be deposited. Or, regarding this more as a relic of a time when an alpine flora covered the land, the assertion might be ventured on that a north-eastern slope would have the bleakest aspect, and that on such a slope boreal types would longest survive.

It is to be regretted that such a limited quantity was gathered by Mr. West and myself on Whernside, as if the moss is very local (as on Ben More) it may be no easy matter to find the precise spot again. The *facies* of the moss, when growing, was not appreciably different from *A. palustre*, the only contrast being that the colour of the tuft, or young barren shoot, was of a paler, yellower green, and the leaves more imbricated, more closely overlying one another, than is generally the case in the common species. The moss is one I had never before seen, and until Mr. Boswell recognised it neither he nor I knew that it was a British plant at all. I have never received, or even seen, continental specimens, and should imagine the species to be almost unrepresented in English herbaria. Mr. West and myself, if all go well, will certainly make an effort to re-gather it in quantity in the spring. I had not intended to record its discovery at all until we had so re-gathered it; this present record is forced upon me by others threatening to publish the facts if I do not.

III. *Fontinalis gracilis*, Lindb. (F. minor, Wahlenberg.) This moss, not previously known as British, was detected at Malham Cove in 1876, by Prof. Barker, of Owen's College—a most acute observer, as Mr. Fergusson informs me. I have received a specimen. When not in fruit I do not wonder it should have been hitherto overlooked, since in *facies* it bears a considerable resemblance to *Hypnum cordifolium* when growing in water, or to *H. fluitans*. I do not mean that examination with a lens will not instantly reveal the difference, for it will; but to the naked eye the similarity is so great, that I am sure if I had chanced to find it growing by the Aire at Malham Cove, when last there, unknowing that *Fontinalis gracilis* grew there, I should have said in my mind, "*Hypnum fluitans*," and passed on. Of course to so pass mosses is a dangerous thing, a bad habit; and yet how often it is done, and espe-

cially often by bryologists of the middle rank, so to say—by those who have mastered the initial difficulties of the study, and who have acquired sufficient familiarity with moss-physiognomy to know fairly well some 90 or 100 common species at sight ; or by those who collect *en masse* for closet study at leisure, when out moss-trooping for a holiday, in preference to “killing time, and covering no ground at all,” by stopping every few yards for careful investigation of what they see *in situ*.—[It is intended to issue, with an early number, a plate illustrating Nos. II. and III.—*Eds. Not.*]

THE SEXUAL REPRODUCTION OF FUNGI.*

BY THOMAS HICK, B.A., B.Sc.

REFERENCES TO PLATE II.

- FIG. I. Development of spore, and formation of a plasmodium of *Physarum album* (after Cienkowski).
- FIG. II. Successive stages (1, 2, 3, 4) of a zygospore of *Phycomyces nitens*, with the dichotomous processes. When the zygospore is mature, the processes are still more branched than is here represented. (After Van Tieghem and Le Monnier).
- FIG. III. Formation of the oospores of *Saprolegnia*. Og, is the oogonium : o, the oospores ; a, antheridium. (After Pringsheim).
- FIG. IV. Diagramatic section through young apothecium of *Ascobolus furfuraceus* : m, mycelium : c, carpogonium ; l, pollinodium or antheridium ; s, ascogenous hyphæ ; a, asci ; p, i, sterile tissue of the apothecium, whence arise the paraphyses. (After Janczewski.)

THOUGH the exigencies of the natural system of classification have necessitated the dispersion of the plants hitherto known as Fungi among the different classes of thallophytes, it is well-nigh certain that for a long time to come the term will continue to be used, if not as the name of a group morphologically distinct, at least as a very convenient designation for those thallophytes whose function of nutrition presents special peculiarities. Chief among these peculiarities is the fact that in these plants the power of decomposing water, carbonic acid and ammonia, as such, and initiating new combinations of the elements of these, so as to produce compounds of a higher degree of complexity, is entirely wanting, due to the absence of that green colouring matter called chlorophyll which is so characteristic of all other plants, with a few exceptions, from the simplest and smallest protophytes to the most highly ornamented phanerogams. That such an important physiological distinction, which is practically a suppression of the functions of assimilation altogether, should avail little for the purposes of classification, will not seem strange

* Read before the Leeds Naturalists' Club and Scientific Association, Sep 17, 1878.

if we remember that the functions of plants are remarkably uniform even in the most widely separated forms, and that in consequence, blink the fact as we may, here, as in the other moiety of the organic world, the best classifications are essentially morphological. In speaking of fungi, therefore, it will be understood that I do so in the sense and with the limitations indicated. For use, the term is simply a physiological one, and is not intended to connote either morphological or classificatory distinctions.

Another matter that perhaps needs a word of explanation is the meaning to be attached to the phrase "sexual reproduction." In the more highly organised plants, as among the higher animals, the sexual organs are so different, at least in external form, and the act of fertilization is attended with so many subordinate but co-operating processes, that its essential character is more or less obscured. By the study of lower forms, however, it becomes obvious that all that is required to constitute a true case of sexual reproduction is the fusion of two individualised fragments of protoplasm, derived either from distinct plants or from different parts of the same plant, whose coalescence is the starting point of a longer or shorter series of changes in the fused mass, that ultimately issue in the production of one or more individuals specifically identical with the parent.

The fact that a process of this nature obtains to any extent among fungi has only been demonstrated within very recent years, through the investigations of Tulasne, De Bary, Pringsheim, Van Tieghem, and others, and, strange though it may seem, has hardly received from English botanists the attention its importance deserves. I have thought, therefore, that a brief account of the principal results that have already been obtained would be interesting to the members of our Society, and might stimulate the working botanist to attempt the verification, and if possible the extension of the observations that have been recorded.

In the most recent classifications of the vegetable kingdom, the fungi are distributed, as already indicated, among the four classes of thallophytes, termed respectively *Protophyta*, *Zygosporææ*, *Oosporeæ*, and *Carpogosporeæ*, and I shall best attain the object I have in view by considering the fungoid forms of each of these in order.

Protophyta. In the class of protophytes we have a number of fungi arranged under the heads of *Schizomycetes* and *Saccharomyces*. The former includes the somewhat numerous forms of Bacteria, and the latter the so-called Torula, or yeast fungus. In the *Schizomycetes* multiplication always takes place by transverse division. In *Saccharomyces* it is brought about by gemmation, or budding, and by the endogenous formation of

ascospores. In neither group do we as yet know of any sexual process of propagation, and we may therefore pass on at once to the

Zygosporeæ. The fungi placed in this class are grouped into two orders, *Myxomycetes*, or *Myxogastres*, and *Zygomycetes*, in both of which examples of sexual reproduction are met with. As might have been expected, however, from the simple structure of the organisms concerned, the process is by no means a complicated one, and is altogether wanting in some of the features usually regarded as essential.

Myxomycetes. The life-history of the *Myxomycetes* is in many respects so peculiar, and their outward aspect, at certain stages, so different from that of most plants, that by some naturalists they have been excluded from the vegetable kingdom, and have been treated as animals. But the best authorities now regard them as forming a distinct group of plants, which in the absence of chlorophyll, in the function of nutrition, and the mode of formation of their spores, have close affinities with the fungi. Many of them, such as the *Arcyrias*, *Physarums*, *Stemonites*, and *Trichias*, are common in the autumn on old decayed stumps, where they may often be gathered in all stages of development. Several of these form a peculiarly constructed sporangium containing a capillitium of closely meshed or free threads, among which a large number of small spores are produced. The sexual process, which is here termed "conjugation" on account of the similarity of the uniting masses of protoplasm, is effected by the contents of the spores, and may be described generally as follows :—

The spores having been scattered by the rupture of the structureless walls of the sporangium and the elasticity of the capillitium, are capable of germination as soon as the requisite warmth, moisture, and a suitable substratum are obtained. Should these conditions be wanting, their vital activity will remain inactive a considerably time, without being entirely lost. On germination the spores do not form any structure comparable to the mycelial threads so commonly produced by fungus spores, but the cellulose coat ruptures, and the protoplasmic contents come out in a naked condition, and, as is usual with free fragments of protoplasm, assume a more or less globular form. Losing this after a short time, and becoming elongated and somewhat tapering at one extremity, the protoplasm develops a fine cilium and moves about like an *amoeba*. In this condition it lives for a little while, absorbing nourishment, increasing in bulk, and even multiplying by division, and may be conveniently spoken of as a zoospore. But by-and-by the nucleus disappears, the cilium is lost, the amœboid movements become sluggish, the dividing process comes to an end, and a contrary one sets in. Two, three, or more of these amœbi-form zoospores coalesce or "conjugate,"

and give rise to a larger mass of protoplasm, termed "plasmodium," which has most of the characters of the individuals of which it is composed, differing from them chiefly in size. Subsequently the plasmodia themselves conjugate in a wholesale sort of way, and growing by the absorption of fresh nutriment, the substratum becomes covered with an amorphous mass of richly granular protoplasm, whose appearance is remarkably characteristic. Ultimately, by a species of contraction or condensation of the protoplasm round certain points, the mass becomes broken up into a number of more or less distinct portions, which take on the form of the mature sporangia. At first each of these portions of protoplasm is homogeneous throughout, but in a very short time the surface becomes differentiated into a kind of structureless membrane, while the interior passes over without the intermediate formation of any cellular structure, into spores and capillitium. The whole now forms a perfect sporangium (Fig. 1, Plate II).

Thus the cycle of phenomena which in the aggregate make up the life-history of one of these remarkable organisms returns into itself, and so long as the conditions are favourable, may be indefinitely repeated. That the process we have described as "conjugation" should be regarded as a sexual mode of reproduction, may appear at first sight an unwarrantable use, or indeed an abuse of the terms employed; we believe, nevertheless, that if due allowance be made for the many abnormalities exhibited by these plants, and the phenomena under consideration be compared with what occurs in other zygosporæ, the interpretation put upon them will hardly be regarded as either strained or unnatural.

(To be continued.)

Short Notes and Queries.

MOLLUSCA OF NEIGHBOURHOOD OF HULL.—I can add one or two species to those in Mr. Butterell's list in the *Naturalist* for December. *Ancylus fluviatilis* occurs in the Hotham Beck, and in streamlets about Brough and Welton. *Vertigo edentula* was found near Brough at the meeting of the Yorkshire Naturalists' Union there. *Helix rufescens* can scarcely fail to occur. It is found at Goole, and our late recorder in conchology, the Rev. R. D. Maxwell, took it at Bridlington. *Conovulus myosotis* should be looked for in marshes by the Humber. Mr. Maxwell found an empty shell among tidal debris on the banks of the Ouse at Goole, probably washed up from below. The same gentleman also found two or three small specimens of *Tellina tenuis*, dead, but containing the soft parts, so that this species probably lives somewhere near the mouth of the Humber. If Mr. Butterell includes the Market Weighton canal in his area, *Unio pictorum* and *U. tumidus*, which inhabit it, may be added to his list, and it is very likely that *Sphærium rivicola* and the *Paludineæ* would reward a search in the same locality.—H. F. PARSONS, Goole.

ALTITUDE TO WHICH *Luzula spicata* DESCENDS.—Mr. F. A. Lees is, I think, greatly mistaken in supposing (*Naturalist*, p. 69) that *Luzula spicata* does not, in Britain, descend below 2,800 feet. In the "Students' Flora" it is said to grow as low as 1000 feet, and I have an impression that I have seen it (though I cannot at present say where) at not much above that altitude. In Perthshire I have not seen it much lower than 2,400 feet.—F. BUCHANAN WHITE, Perth, 3rd Dec.

BRYOLOGICAL NOTES.—In recent numbers of the *Naturalist* Mr. Whitehead makes very interesting explanations regarding the discovery of *Seligeria tristicha* in England. Schimper's statements in the last edition of the Synopsis, with regard to the British localities of this species, are rather curious when compared and analysed. First of all he states that the plant is rare in England and Scotland—a general statement which is quite satisfactory. At the end of the Synopsis, in the pages devoted to new localities for some rare mosses, he states that the plant had been gathered at Castleton by Mr. Whitehead, and at Blair Athole by Miss McInroy in 1860. Notwithstanding Mr. Whitehead's explanation in the last number of the *Naturalist*, it seems to me still very doubtful whether the plant occurs at Castleton; and with regard to the Blair Athole locality, the date of the discovery of the plant there is not correct. It should be 1858, not 1860. I pointed this out in one of the earlier numbers of *Grevillea*, and I would not have noticed it here had it not been that Dr. Lees in a late number of the *Naturalist* accepts Schimper's date without suspicion, and that the error is likely to be accepted by others. Mr. Whitehead refers to several other mistakes in the Synopsis. For these unfortunately one has not long to search, for they are neither few nor far between. Some of them are amusing mis-translations. For example, under *Pottia crinita*, Wilson in his *Bryologia* gives localities for the plant, and dates when discovered or gathered—thus, "East coast of Angusshire, between Montrose and Redhead, 1827-8, also on the coast of Fifeshire, Thomas Drummond. Near Aberdeen, Dr. G. Dickie." This appears in the Synopsis thus:—"On the east coast of Angusshire, between Montrose and Redhead, 1827 (Wilson). On the shores of Fifeshire, near Aberdeen, Dr. G. Dickie." This is a mis-translation almost as remarkable as that by Bridel, in which he supposes that the name of the gentleman on whose property *Grimmia unicolor* was discovered in Clova, is the name of the discoverer of the plant. Hardly any one, within the last dozen years, has been a more enthusiastic and successful worker among the mosses of the south of England than Mr. E. M. Holmes, late of Plymouth, and now of London; and it might have been expected that he would have been mentioned by Schimper in connection with some of the discoveries of species new to Britain or to science; but no—I do not at present remember if his name occurs in the Synopsis. We have, under *Didymodon sinuosus*, "Plymouth, Mr. Hunt"; under *Trichostomum littorale* we have "Plymouth, Mr. Hunt," again. Mr. Holmes was the first to gather these and other important mosses near Plymouth, and

Mr. Hunt, I fancy, never gathered a single moss in Devon. With regard to the mosses of the north of England, matters are still worse. I think I am accurate in making the following corrections of, and additions to, the statements in the Synopsis. Under *Campylopus paradoxus*, to "Near Levens, Westmoreland, communicated by Dr. Wood," add "discovered first of all near Wooler by Messrs. Hardy and Boyd, and at Levens by Mr. Barnes." Under *Discelium nudum*, to "abundantly near Manchester (Wood)," add "discovered there by Mr. G. Cayley, and afterwards found in many situations in the same neighbourhood." The plant was unknown when Mr. Cayley first gathered it. Under *Bryum Warneum* for "near Southport and at Ashton-under-Lyne, Wood," read, "Near Southport, Wilson and Marrat; near Ashton-under-Lyne, Mr. Whitehead." Under *Bryum calophyllum*, for "Near Southport.....Wood..... near Ashton-under-Lyne. Whitehead and Schofield," read, "Near Southport, Mr. Marrat; near Ashton-under-Lyne, Mr. R. Gordon." Under *Bryum turbinatum*, for "long unobserved in Britain, but gathered abundantly in 1865, on wet gravel near Ashton-under-Lyne by Whitehead and Schofield," read, "Long known in Britain before its discovery near Ashton-under-Lyne, by Mr. R. Gordon." Under *Atrichum crispum*, for "At Staly Brushes.....where Dr. Wood in the year 1860 first detected it in Britain," read, "First observed by Nowell, near Todmorden; Staly Brushes, Whitehead, 1859," &c. Under *Amblystegium confervoides*, for "Near Kendal, J. B. Wood," read "near Kendal, Barnes." Under *Bryum neodamense*—but I need not extend the list by giving more instances, though a very large number could be given. All will agree with me when I say, first, that it is a pity Schimper did not more closely follow Wilson's *Bryologia*, which is one of the most accurate, if not the most accurate work on mosses which I wot of, and which would have saved the Synopsis from many errors; and secondly, that it is unfortunate that Schimper so often sinks the discoverer of a plant in a country or district—the plodding, hard-working discoverer,—below those who merely distribute what others have gathered and given them.—J. FERGUSSON, The Manse, Fern, Brechin, N.B.

"TRANSACTIONS OF THE YORKSHIRE NATURALISTS' UNION." Part I. for 1877.—Owing to a great pressure on our space, we are unable to do more than just mention this issue, and congratulate both the members and reporters on its appearance, its satisfactory character, and usefulness. We regret that two sections are not yet ready, and hope to say more about the whole when they appear.—[Eds. Nat.]

THE BIJOU LIST OF BRITISH BUTTERFLIES.—Mr. H. W. Marsden, of Gloucester, has sent us copies of a very neatly got-up pocket-book list bearing the above title. It includes all the named species, aberrations, and varieties, and also the *reputed* British species, all of which however are clearly distinguished from each other. Some of the reputed species we think would have been better omitted, as even their "repute" is more than doubtful.—[Eds. Nat.]

Rainfall for November.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·14	11	30·69	* 29·99	9	0·36
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	5·10	21	...	...	12	2·00 §
HALIFAX... (F. G. S. Rawson)	360	3·65	13	42·73	56·69	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	†	...	...	...	...	...
BARNSELY ... (T. Lister) ...	350	2·30	16	24·47	32·04	24	0·40
INGBIRCHWORTH (do.)	853	3·02	19	36·67	46·51	9	0·70
WENTWORTH CASTLE (do.)...	520	2·81	14	26·11	37·12	15	0·67
GOOLE ... (H. F. Parsons) ...	25	2·64	20	22·49	24·70	11	0·56 §

* This is the average to date for 12 years, 1866-77. † No Returns.

§ This fell as snow.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Dec. 11th.—Mr. E. R. Kell, C.E., continued his series of papers on “The Eggs of British Birds,” with plates and brief descriptions of the birds and their habits. That useful family for destroying rats, mice, and other vermin, the owls, was graphically described. The president (Mr. T. Lister), made a few observations of birds which, in this extraordinary season, with a temperature on a succession of nights ranging from 6 to 20 degrees below freezing point, have afforded an unusual treat to field naturalists. On the 12th Mr. W. Talbot noted the merganser, scaup-duck, pochard, immense flocks of mallards, five snipe, many golden plovers; three merlins on the 25th; white-fronted goose, 28th; on the 30th November as many as eight kingfishers, a great spotted woodpecker, and five male sparrow hawks. Mr. J. Whitehead saw a wheatear at Mexborough so late as Nov. 17th; myself and Mr. H. Parker have noted many wild ducks at Stainborough, &c. Five herons flew north over Barnsley Dec. 8th. It is a hard time for the small birds—the thrush, blackbird, storm-cock, fieldfare, and redwing come about the houses for waste food, and even pied wagtails, titmice, and chaffinches come to share with the sparrows and robins. The latter sang Dec. 12th.—T. LISTER.

BOSTON MICROSCOPICAL SOCIETY AND LITERARY AND SCIENTIFIC INSTITUTION.—The above society has been formed by Messrs. F. W. Morris and B. T. Storr, under the presidency of the Rev. G. E. Pattenden,

LL.D. The opening meeting was held Dec. 16th, and an address was given by the president, who expounded in a most vigorous and learned manner the sciences of botany, chemistry, geology, microscopy, and congratulated the promoters upon the success which had attended them during the formation of the society. A *conversazione* then took place, and several specimens of interest were exhibited by the members.

BRADFORD NATURALISTS' SOCIETY.—Meeting Nov. 26th, Mr. Illingworth in the chair.—It was decided to invite six gentlemen from neighbouring societies to the annual *soirée*. Mr. Benney then gave a lecture on "The Weather," showing that water must be expanded 860 times to be lighter than air at sea level, and that the rapid condensation of particles caused a vacuum, into which the air rushed with a rotatory motion, this latter theory having been promulgated by Mr. Rowell, of Oxford. He also explained the various kinds of storms.

MEETING Dec. 10th, the president in the chair.—This was the fourth annual meeting, which took the form of a *soirée*. About seventy persons sat down to tea, after which the election of officers took place. Mr. W. Jagger was re-elected president, and all the retiring officers were also re-elected. The annual report was read, and showed the society to be in a flourishing condition. Messrs. Jagger, Barber, and others addressed the meeting.

GOOLE SCIENTIFIC SOCIETY.—Meeting Dec. 6th.—Lecture by S. Drew, M.D., D.Sc., on "Our Neighbour the Moon."

MEETING, Dec. 13th.—The following specimens were exhibited:—By Mr. Birks, the common gull; by Mr. Thorpe, lung of calf infested with parasitic entozoa, probably *Strongylus micrurus*; by Mr. Harrison, microscopic slides. The reports of recorders were postponed till Jan. 17th.—H. FRANKLIN PARSONS.

HUDDERSFIELD SCIENTIFIC CLUB.—Annual meeting Dec. 13th, Mr. G. T. Porritt, president, in the chair.—The officers for the coming year were elected as follows:—President, Mr. Joseph French; vice-president, Mr. S. L. Mosley; secretary and treasurer, Mr. George Brook, *ter.*; librarian, Mr. J. B. Littlewood; delegate to Yorkshire Naturalists' Union, Mr. John Conacher. The chairman exhibited a box of lepidoptera he had just received from Mr. C. G. Barrett, of Pembroke, including *Cucullia absynthii*, *Lobophora viretata*, *Diasemia literalis*, *Scopula ferrugalis*, *Crambus dumetellus*, *Ephestia sinuella*, *E. cinerosella* and *Eudorea coarctalis*. He also showed a series of beautifully coloured plates from the "Transactions" of the Linnean Society of London. Mr. C. P. Hobkirk showed the following mosses:—*Aulacomnium palustre* and *A. androgynum* (British), *A. turgidum* in fruit (Norway), and *A. heterostichum*, United States. The examination of these specimens under the microscope, and details of their characters, created great interest.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting, 25th November, Mr. S. J. Capper, president, in the chair.—Mr. Willoughby Gardner read an interesting paper on “The Diurnal Lepidoptera of Berkshire.” Mr. M'Dannel, of H.M.S. *Resistance*, exhibited a unique collection of insects, entombed in gum copal, elegantly carved and polished by himself, collected in east-central Africa. The president, a perforated cone from Scotch fir, sent him by Mr. N. Herd, of Perth, which contained larvæ and pupæ of *Eupithecia togata*. Mr. Johnson, 39 species of *Tineæ*.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—Ninth annual meeting, Dec. 3rd.—The retiring president, Mr. Hy. Pocklington, F.R.M.S., occupied the chair. The ballot for the new council resulted in the election of Mr. Edward Atkinson, F.L.S., F.Z.S., as president; the re-election of the secretary, Mr. W. Denison Roebuck; treasurer, Mr. W. E. Clarke; and librarian, Mr. W. H. Hay. The vice-presidents elected were Messrs. C. H. Bothamley, B. Holgate, F.G.S., W. Howgate, and S. Jefferson, F.C.S. The annual reports and balance-sheet were then read and passed. The president reviewed the society's work during the past year, and votes of thanks terminated the meeting. It will be seen that for convenience sake the annual meeting has been fixed to be held in future on the first Tuesday in December, the meetings being resumed in the last week of January each year.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Meeting; Mr. W. H. Pearson, V.P., in the chair.—Amongst the objects exhibited was a beautiful series of microscopical preparations by Mr. Peter G. Cunliffe, F.R.M.S., showing the progressive development of the fructification of *Funaria hygrometrica*. A number of rare cryptogamic plants were exhibited, one of which was *Aulacomnium turgidum*, from the north-eastern slope of Whernside, where it was recently discovered by Mr. F. Arnold Lees, F.L.S., and Mr. W. West. Fruiting specimens communicated by Mr. Percival, from Norway, were shown along with it for the purpose of comparison, leaving no doubt as to the British plant being the true *A. turgidum*. Another interesting moss exhibited was a fruiting specimen, also from the north of Europe, of *Paludella squarrosa*. This moss was found growing at Knutsford so long ago as the year 1831, by the late Mr. Wilson, author of the “Bryologia Britannica,” but it was in a barren state, and the station is now lost. It has been found in small quantity in the West Riding of Yorkshire, and perhaps also in one or two other localities, but never fertile. The fertile specimen exhibited was from the Dovrefjeld. Mr. Wild and Mr. Pearson exhibited some hepaticæ new to Britain.

SHEFFIELD NATURALISTS' CLUB.—Annual general meeting, Dr. Hime in the chair.—Mr. W. R. Carter, the hon. secretary, read the sixth annual report. During the summer there were excursions to Sherwood Forest, the Dukeries, Bakewell and Lathkill Dale, and Strines and Bradfield;

and with the Yorkshire Naturalists' Union to Wharnccliffe Woods and Wortley. The financial position of the society is satisfactory. Mr. F. Brittain was elected president for the ensuing year, Dr. Hime and Mr. A. H. Allen, the vice-presidents, and Mr. C. Burrell, hon. sec. Mr. H. C. Sorby read an interesting paper on "The Mineral Constitution of Shells and Corals, and its connection with the Organic Structure."

WAKEFIELD NATURALISTS' SOCIETY.—Meeting, Dec. 6th, Mr. William Talbot, v.p., in the chair.—Mr. Spurling exhibited some fine specimens of Taxidermic art, including the following :—*Porzana maruetta* (spotted crake), and *Turdus Iliacus* (redwing). The exhibits by Mr. H. Sims were *A. saucea*, *A. citraria*, *A. aurantiana* (male and female); by Mr. G. Wilson, *D. Orion*, *A. ripæ*, and *N. trepida*. Mr. E. B. Wrigglesworth read a paper on *Melolontha vulgaris*, the cockchafer. He referred first to the system of Linnæus, who divided this group into three sections, in the first of which the thorax is armed with horns, the second with the thorax unarmed but having horns on the head, and the third those like *M. vulgaris*, in which the head and thorax are both without horns, and in illustration showed specimens of *Typhæus vulgaris*, *Linodendron cylindricum*, *Scarabæus lunaris*, and *Melolontha vulgaris*. He next explained the cause of its altered position in our modern nomenclature, pointing out the distinguishing features of the *Melolontha*, illustrating his remarks with a number of microscopic slides and a beautiful specimen of *Lucanus cervus*, the great stag-beetle, kindly sent him by G. T. Porritt, Esq., F.L.S. He finally discussed at some length the habits and food of both larvæ and imago.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Dec. 11th, Mr. G. Webster in the chair.—Part I. of the "Transactions" of the Yorkshire Naturalists' Union was laid on the table. The chairman exhibited a large number of finely mounted specimens of the bramble tribe, from the West-Riding of Yorkshire—several species new to the Yorkshire list—amongst which were the following *Rubi*; *R. calvatus*, Dringhouses; *R. Lejeunii*, Lotherton; *R. fissus*, and *R. cæsius*, var. *agrestis*, Askham Bog; *R. Koehleri*, Dringhouses; *R. Lindleianus*, Acomb and Lotherton; *R. tuberculatus*, Acomb; *R. radula* and *R. sublustris*, near Acomb; *R. fusco-ater*, Poppleton; *R. carpinifolius*, Dringhouses; Mr. G. Bacon: eggs of *Falco peregrinus*, *F. æsalon*, and *F. tinnunculus*, of the latter a very fine variety; Mr. William Simmons: some finely preserved larvæ, also the following tortrices :—*Dictyopteryx lorquiriana*, *Dicrorampa sequana* and *plumbana*, *Eupæcilia notulana* and *rupicolana*; the secretary the following very rare species :—*Xylomiges conspicillaris*, *Anarta melanopa*, *Eupithecia togata*, *Crambus ericellus* and *adipellus*, *Trachonitis Pryerella*, *Phycis adornatella* and *Melissoblastes cephalonica*. The paper on collecting in Sherwood Forest was not read by the secretary on account of ill health; it will be read at the January meeting.—WM. PREST, Hon. Sec.

Diary.—Meetings of Societies.

- Jan. 7. Bishop Auckland Naturalists' Club.—Liversedge Naturalists'.—Bradford Naturalists', Inaugural Address of President, Mr. Wm. Jagger.—Huddersfield Literary and Scientific Society, Microscopic Soirée.
- „ 8. York and District Naturalists' Field Club, Paper: "A week in Sherwood Forest," W. Prest.
- „ 10. Yorkshire Naturalists' Union. (See advt. on cover).
- „ 11. Yorkshire Naturalists' Union, Annual Meeting in Mechanics' Institute, Leeds. (See advt. on cover).
- „ 16. North Staffordshire Naturalists' Field Club, at Newcastle.
- „ 21. Bradford Naturalists', Paper: "Additions to the local list of Lepidoptera in 1878," Mr. J. W. Carter.
- „ 24. Huddersfield Scientific Club, Inaugural Address by President, Mr. Joseph French.
- „ 27. Lancashire and Cheshire Entomological Society.—Huddersfield Naturalists'.
- „ 28. Leeds Naturalists' Club, &c., Inaugural Address by President, Mr. Edward Atkinson, F.L.S., F.Z.S.

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No. XLIII.

FEBRUARY, 1879.

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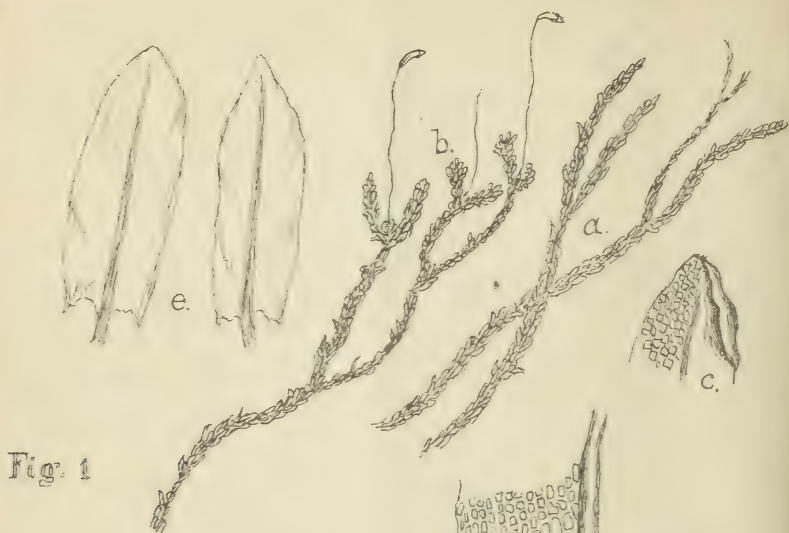


Fig. 1

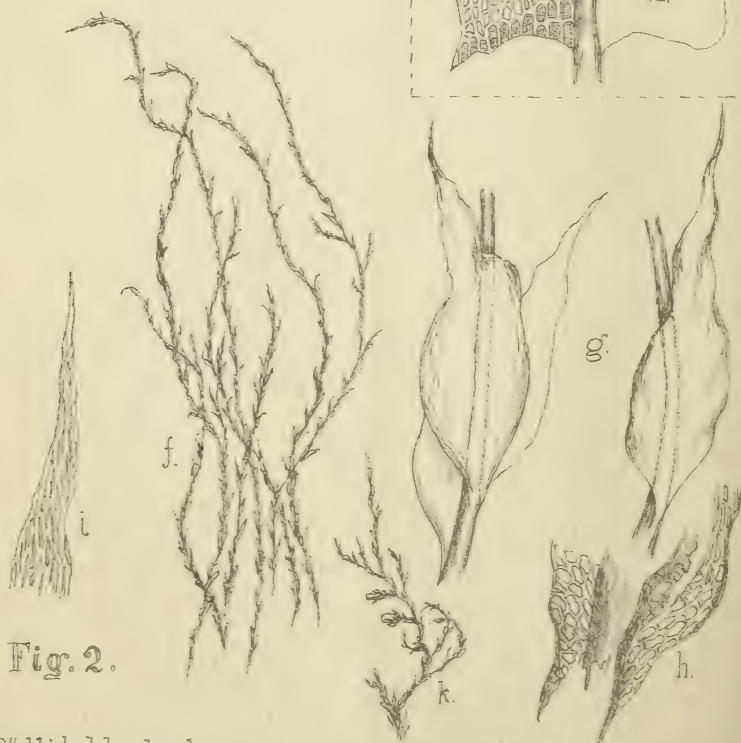


Fig. 2.

C.P. Hobkirk del. ad nat.

NATURALIST, PL. III.

Original Articles.

REFERENCES TO PLATE III.

[THE NEW YORKSHIRE MOSSES.—*vide* p. 85.]

FIG. 1. *Aulacomnium turgidum*, Wahl.

- a. Lees and West's plant from Whernside (nat. size).
- b. Fruiting specimen from Norway (nat. size).
- c. Apex of leaf, magnified.
- d. Base of do. do.
- e. Outline of leaf.

FIG. 2. *Fontinalis* (*antipyretica*, var.) *gracilis*, Lindb.

- f. Prof. Barker's plant from Malham (nat. size.).
- g. Outline of leaf.
- h. Base of do.
- i. Apex of do.
- k. Fruiting specimen from Helsingfors. Gathered by Lindberg.
Comd. Dr. Braithwaite.

THE SEXUAL REPRODUCTION OF FUNGI.

BY THOMAS HICK, B.A., B.SC.

(Concluded.)

Zygomycetes. Another order of fungoid *Zygosporæ* in which a sexual mode of reproduction has been observed is that of the *Zygomycetes*, which includes the well-known *Mucors*. A common but excellent type of the order is found in *Mucor mucedo*, which may be met with on raw and preserved fruits, animal excreta, &c., at all seasons of the year. The vegetative body of this plant consists of a number of tubular, usually aseptate threads, which become more or less closely interwoven during growth, to form a felted mass termed the mycelium. It is reproduced asexually by chlamydospores, and by spores formed endogenously in a sporangium, and sexually by zygospores which are formed in this way.

Two perfectly similar and neighbouring threads come into contact, or "conjugate," by their free swollen extremities, the contents of which become shut off from the contents of the rest of the threads, by transverse partitions. These threads are straight in *Mucor*, *Rhizopus*, and *Chaetocladium*, but in *Phycomyces* they are curved. The double partition which separates the protoplasm in the dilated heads of the conjugating threads soon becomes absorbed, and the two portions then coalesce and blend together to form a single mass, which, having formed for itself a double cellulose coat, becomes the zygospore (Fig. 2, Pl. II).

The zygospore thus formed remains quiescent for a time, and is said to require desiccation before it germinates. When this occurs, the delicate

inner coat protrudes itself and elongates into a short tube, which terminates, without the intervention of a mycelium, in an ordinary sporangium, in which spores are produced asexually.

In connection with the formation of the zygospores of *Phycomyces nitens*, Van Tieghem and Le Monnier have described a somewhat curious but highly significant phenomenon. During the time that conjugation is being effected by the arched cells, these produce on the zone adjoining the transverse partitions which cut off the uniting portions, a series of repeatedly dichotomous processes as represented in Fig. 2. These do not appear simultaneously but in successive order, and upon one of the arcuate cells before the other, and the authors ingeniously suggest that in this we have a "first step in the differentiation of the two elements whose union forms the germ-cell, an indication as yet feebly marked, but still very distinct, of sexuality, in the process of conjugation." When we come to the *Discomycetes* and the *Lichens* we shall see how the formation of apparently homologous processes gives rise to the fruit-cup, so characteristic of these groups, as well as to the so-called "paraphyses" with which the cups are accompanied.

OOSPOREÆ. In the fungoid *Zygosporeæ* the conjugating cells—whether naked and motile, or stationary and clothed with a cellulose coat—are in the main so similar to one another, that in the majority of cases it is impossible to distinguish them as male and female. In the *Oosporeæ* the case is otherwise. Here there are such well-marked morphological and physiological differences between the two elements as to render distinction both obvious and easy, and even to necessitate the employment of different terms. Accordingly the male organ is spoken of as the *Antheridium*, the female organ as the *Oogonium*, while the spore formed as the result of the sexual act is conveniently designated as an *Oospore*.

In this class sexual reproduction has been made out more or less satisfactorily in the genera *Saprolegnia* and *Peronospora*, which may be taken as types of the orders *Saprolegniæ* and *Peronosporeæ*.

Saprolegniæ. The *Saprolegnias* are fungi, not very dissimilar in some of their characters from the *Mucors*. They make their appearance on animal substances partially or wholly immersed in water, especially on dead insects. Sometimes they attach living fish, not only when domesticated in aquaria, but also in the wild state, as was pointed out by Mr. Brook in the *Naturalist* for May, 1878. They are unicellular plants consisting of long unarticulated tubular threads, whose proximal ends penetrate the nourishing substratum, while the distal ones spread out into the surrounding water. Under favourable conditions they multiply themselves very rapidly by asexual zoospores or zoogonidia,

which are developed in the clavate extremities of the threads, and it is only after an indefinite number of such generations have been produced, that the sexual individuals make their appearance.

The free ends of certain threads swell up into a globular form and become filled with a dense and richly granular protoplasm. The cavity of this globular body becomes separated from that of the filament by a transverse wall, and it then forms the Oogonium. The protoplasmic contents of the Oogonium contract by the expulsion of water and divide into two, four, or more portions, which rounding themselves off constitute the oospheres, and await the advent of the male element.

Meanwhile the male organs are also formed as much thinner lateral branches which usually arise below the Oogonium. They are as a rule strongly curved so that their extremities are brought into close proximity with the Oogonium. The extremity of each branch swells a little and becomes separated by a transverse wall, giving rise to a large terminal cell, which is the Antheridium (Fig. 3).

The process of fertilization of the oospheres by the contents of the Antheridium appears to be a remarkable one. According to Pringsheim the inner wall of the Oogonium produces at different points a number of wart-like knobs, which may or may not remain covered with the outer wall. When the Antheridium is fully formed it applies itself firmly to the outer wall of the Oogonium, and manages to cover one or more of the points at which warty protuberances have arisen. The inner wall of the Antheridium now develops a small protuberance which penetrates the Oogonium wall, comes in contact with one of the projections from the inner layer, through which it grows, forming a short narrow tube whose extremity conceals itself among the oospheres. The end of the fertilizing tube now opens itself; the contents of the Antheridium pass through into the Oogonium, and the oospheres become fertilized thereby. Subsequently they surround themselves with thick firm walls, and remain for months quietly lying in the Oogonia. When germination takes place the oospore either develops a germ tube, which immediately grows to a branched plant, in which later on zoospores are found, or the oospore puts forth a short tube which opens at the apex and empties the whole of its contents in the form of zoospores.

Peronosporæ. The type of this order, *Peronospora infestans*, has been the subject of repeated observation and discussion owing to the fact that it is the chief cause of the well-known potato disease. Very prolonged investigations into its life-history have been made by Mr. Worthington G. Smith whose papers in the Gardeners' Chronicle, Monthly Microscopical Journal, and Quarterly Journal of Microscopical Science

may be consulted for full and elaborate details and carefully executed illustrations.

It is reproduced sexually in a manner which closely resembles that described in *Saprolegnia*. Some of the articulated hyphæ give rise to thickwalled spherical oogonia, while neighbouring ones produce smaller bodies termed Antheridia. These come into contact by a sort of conjugation, and as a result the contents of the Oogonia become converted into oospores. After passing through a period of rest, these germinate, and either produce vegetative threads which form the ordinary mycelium, or biciliated zoospores, which ultimately become quiescent, and then grow up into new plants.

CARPOSPOREÆ. We now come to an extraordinarily large number of fungi, very various in external form and appearance, of which our knowledge is of a somewhat fragmentary character, but which are provisionally placed among the *Carposporeæ*. They constitute the orders designated by fungologists *Ascomycetes*, *Æcidiumycetes*, *Ustilagineæ*, and *Basidiumycetes*, the general *facies* of which will be familiar to all who have given any attention to these members of the vegetable kingdom. In the three last orders, the existence of a sexual mode of propagation can hardly be said as yet to have been satisfactorily demonstrated, though in a few instances it has been asserted and circumstantially described. Confirmatory observations, however, are still desiderated, and until these come to hand, we shall err on the safe side in not building too much on what rests upon the investigations of single observers.

Ascomycetes. With respect to the *Ascomycetes*, however, no such caution is necessary, as in all the families it includes, sexual generation may be confidently stated to take place. Thus in *Erysiphe* and its allies, the small globular perithecia or conceptacles, are in fact but the sexually produced fruits, formed by means of sexual organs; and the same may be said of the *Eurotium* form of *Aspergillus glaucus*. In *Penicillium*, as well as in other genera of *Tuberaceæ* and in the *Pyrenomycetes*, the hitherto much misunderstood sclerotia have also been shown to be in close connection with a sexual act.

It is, however, in the *Discomycetes* that we have perhaps the most interesting details connected with the sexual reproduction of this order. The family is tolerably well known from the fact that it includes the whole of the *Pezizas* and *Ascoboli*, which are almost universally distributed, and are as common as they are numerous. A vertical section through a typical species shows that it consists of a vegetative part composed of fine mycelial filaments, and a reproductive part which is usually designated as the "receptacle," or "apothecium." The latter

is a discoid body, the base of which is pseudo-parenchymatous, and whose upper surface bears a number of clavate "asci," containing spores. Intermingled with the "asci" are numerous delicate filaments named "paraphyses," whose free tips are usually slightly swollen and contain a little colouring matter. The origin and homologies of these structures were never set in their true light until the course of their development had been carefully followed, and they were shown to be the result of sexual impregnation. This was first accomplished in 1863 by the indefatigable De Bary (with whom was subsequently associated Tulasne), who worked upon *Peziza confluens*, and showed that its "apothecia" arose from an act of sexual union. In 1871 Janczewski wrought out the development of the receptacle in *Ascobolus furfuraceus*, which is diagrammatically shown in Fig. 4, and may be briefly described as follows:—

The germinating spore gives rise to a delicate mycelium, portions of which become differentiated into the Carpogonium and the Antheridium. The former consists of a row of wider but shorter cells, and is strongly curved; the latter consists of a branched thread, differing but little from the hyphæ of the mycelium. The Antheridium attaches itself to the anterior portion of the Carpogonium, around which it becomes tightly twisted. In consequence of fertilization, one of the middle cells of the Carpogonium grows larger than the rest, becomes somewhat rounded, and by sprouting produces numerous threads, from which, later on, are developed the asci. Meanwhile there has arisen from the hyphæ bearing the sexual organs a mass of pseudo-parenchyma which envelopes the whole Carpogonium, and forms the sterile part of the fruit. The ascogenous threads springing from the Carpogonium thus lie together within the fruit-body or sporocarp, in a sub-hymenial layer, and send outwards thick club-shaped branches—the asci—within which the spores arise by free cell-formation. The sterile hyphæ also produce numerous parallel branches, the paraphyses, which grow up between the asci, with which they form the hymenium. Finally, the pseudo-parenchymatous sheath opens at the summit, the hymenium comes to lie on the surface, and expands itself as a mature receptacle (Fig. 4).

Only one other family of the order *Ascomycetes* remains to be noticed, but that an important one, and one which has lately occupied a considerable share of attention. I refer to the *Lichens*. In treating them as Fungi, and thus bringing them within the scope of this paper, I am at once following in the wake of very high authorities, and giving effect to my own personal convictions. Much has been said

both for and against the theory that Lichens are *Ascomycetous* Fungi parasitic on algæ, since 1868, when Schwendener formally stated it, and I for one am not disposed to dogmatise upon the subject. But this I must say, that the more I see of their structure and morphology, and the more closely I observe the different stages of their development under ordinary and natural conditions, on old walls, gates, the trunks of trees, &c., the more does the theory appear to me to harmonise with the facts. In like manner the researches that have been undertaken during the last few years, with a view to demonstrate the truth or falsity of the theory, appear to me to leave a clear balance in its favour. But this is by the way. Let us turn to what more immediately concerns us, and consider the nature of the process by which their sexual reproduction is brought about.

Our knowledge of this phase of their life history is at present of a very limited character, but the investigations of Stahl* leave little doubt that, like their congeners among the true Fungi, they are propagated in this, as well as in an asexual manner.

In the thallus of every Lichen it is usually possible to distinguish two elements, the characters and relative proportions of which differ in different genera, and even in different species. One of these consists of green cells, the so-called *Gonidia*, which in many cases are identical with free-living algæ, while the other is made up of a number of colourless cellular threads or hyphæ, whose morphological and physiological characters are in the main identical with those of Fungi. The best known reproductive structures are usually spoken of as *Apothecia* and *Spermogonia*. The *apothecia* are similar in almost every detail to the cup-shaped receptacles of the *Discomycetæ* already described. They are composed of a number of clavate spore-bearing asci, intermingled with which are delicate filaments swollen at the tip—the paraphyses. They commonly differ in colour from the thallus on which they are borne. The *Spermogonia* are small cavities of various shapes in the upper surface of the thallus, which produce very small spore-like bodies called *spermatia*.

The “apothecia” of Lichens bearing such a strong resemblance, both in outward appearance and internal structure to those of Fungi, the idea naturally suggests itself that they may have a similar origin. The results of the investigations of Stahl, mentioned above, enable us to assert that at least there is some evidence for the belief that they have.

* An excellent *resumé* of these investigations from the pen of my able friend, Mr. S. H. Vines, M.A., of Cambridge, may be read in the *Quarterly Journal of Microscopical Science* for October, 1878.

Working upon *Collema microphyllum*, Stahl found within the thallus certain structures which he regarded as Carpogonia. Each carpogonium consists of a hyphal filament which is twisted upon itself two or three times to form an ascogonium, and then runs vertically upwards to the surface of the thallus, above which its terminal cell projects. The vertical portion of the thread, from its relation to the ascogonium and the part it plays in the process of fertilization, he considers as physiologically homologous with the Trichogyne of the Florideæ. Fertilization is effected by the spermatia which adhere to the Trichogyne, and apparently the wall becomes absorbed at the spot, and there is free communication between the interior of the spermatium and that of the Trichogyne.

As a result of fertilization, the Trichogyne withers, the Ascogonium enlarges, and filaments are produced from its cells which either become asci themselves, or develop asci as lateral branches. Meanwhile the hyphal filaments of the thallus give rise to a cup-shaped investing mass of felt-work, from which branches grow up between the separating coils of the ascogonium and produce the paraphyses. In this manner the apothecium is gradually built up and constituted, the asci and paraphyses originating from hyphæ entirely distinct from each other as in *Ascobolus furfuraceus*.

With this example of sexual reproduction among Fungi I must for the present take leave of the subject. I am fully conscious that in the rapid review I have taken of it, many important and suggestive details have been omitted, and several most interesting analogies have been left unnoticed. But I have already exceeded the limits assigned me, and must leave those who are sufficiently interested to fill in for themselves whatever is wanting to complete the outline.

Harrogate, Oct., 1878.

FONTINALIS GRACILIS, LIND.

J. S. WESLEY, M.B.

IN the January number of the *Naturalist* the moss *Fontinalis gracilis*, Lindberg, is announced as a distinct species, and as being new to Britain. In the interests of botanical science this statement should not be allowed to pass without comment.

First, as to its claim to specific rank: Schimper in his *Synopsis*, Ed. II. 1876 gives it as *Fontinalis antipyretica*, var. γ *gracilis*, and his description, translated, is as follows:—"More graceful than the ordinary form, often more fasciculately branched, often half-a-foot long, and

without leaves at the base, capsules generally more abundant. Leaves narrower, more acute, the keel less arcuate, more glistening, of firmer structure, leaf cells narrower, more frequently split along the keel, and with the alar expansion at the base of one or other side less reflexed. Capsule and spores as in the type." Then there is given as the synonym *Fontinalis gracilis*, Lindb., Not. Sällsk. Fauna et Fl. Fenn. 1868.*

Schimper goes on to say :—"Against the opinion of the illustrious Lindberg I consider variety γ as not specifically distinct from *F. antipyretica*. I have noticed it in very many localities, more especially in the rivulets of the higher Vosges, where in 1837 I gathered a good supply of specimens loaded with fructification, and twenty years later in the very same place found it manifestly passing in a transitional state towards the normal form. The specimens sent me by its eminent describer exactly agree with those from the Vosges and others sent me from many localities pretty nearly all over Europe, but not with the description set forth by the illustrious Lindberg in the work quoted above. The perichætia are described as radiculose; the fact is, that radicular fibres at the base of the perichætil branch are sometimes present, sometimes wanting, just as in the type *F. antipyretica*; the leaves present the same characters as in it" (the type); "the capsule is found smaller or larger, as often as not of just the same shape and size as in it, not ventricose, nor when dry more constricted below the mouth, nor composed of cells twice as large, as Lindberg says of it; the teeth of the peristome do not differ in the least, either in shape, length, number of articulations, arrangement of tubercles, nor yet in colour; the spores said to be four times the size are found to be not really a quarter larger than in the common form; in it, as in the variety under consideration, spores larger and smaller are found in the same capsule."

There is more about the leaf cells, but the above is sufficient, and is intended for the information of those who have not Schimper's book.

What Mr. Boswell thinks of *F. gracilis* as a species will be clear from this passage :—"At p. 553, he (Schimper) has rather a long observation which seems to be quite conclusive as to its claims to specific rank."

As to *Aulacomnium turgidum* from Whernside, I don't know who the others were, but I plead guilty to having threatened to publish a

* Schimper has misquoted the date; it should be 1865.—*Eds. Nat.*

discovery so interesting and creditable to its finders, if they did not. It was lately shown at the Linnæan Society by Mr. E. M. Holmes. This is stated in the *Athenæum* of Dec. 11th, or thereabouts.

FONTINALIS GRACILIS, LIND., &c.

REV. J. FERGUSSON.

FONTINALIS GRACILIS.—When I accidentally mentioned to Dr. Lees that in 1876 Professor Barker had gathered *Fontinalis gracilis* at Malham Cove, I also mentioned that so far as I was aware it was new to Yorkshire. Had I then supposed that Dr. Lees was to have recorded it in the *Naturalist* as a moss not known to be a native of Britain until it was detected at Malham Cove, I should, in all probability, have given him some information as to its British history and distribution. Such information may still be new and interesting to him, and to others also, and I accordingly send it to you for publication.

I believe the first notice which is given of this plant as a native of Britain is contained in Wilson's "Bryologia Britannica," where it is stated on page 424—"Two varieties of this (*F. antipyretica*), if not distinct species, are found in Britain; one of them with more slender, fasciculate, not spreading branches, and less complicated leaves, found near Dublin and in Scotland, but we have not seen any specimen in fruit. It is probably var. β *minor*, and is often mistaken for *F. squamosa*, from which the carinate leaves will always distinguish it." These remarks, so far as they go, give a very accurate and characteristic description of *Fontinalis gracilis*, and should be sufficient to enable one to distinguish it from our other British species of the genus.

In July, 1866, Messrs. Roy, Bisset, and myself, when botanising in Glen-Prosen, discovered there a barren *Fontinalis*, which Mr. Roy (the only one of us who knew one moss from another) supposed to be *F. squamosa*; and in the following year I again gathered the same plant in a barren state, and sent it to Mr. Wilson, who, with his usual caution, declined to say whether it was anything but a mere variety of *F. antipyretica*, unless fruit were found and proved to be different from that of the other. In 1868 or 1869 (I am not quite sure as to the date) the Rev. Mr. Anderson found the plant with abundance of fruit, and submitted it to Mr. Wilson, who then pronounced it to be a distinct species, and gave it the name of *F. subglobosa*. He was too late in

doing so, for in 1865 Lindberg described and published the same plant under the name of *F. gracilis*. Before and since 1869 Mr. Anderson and myself have distributed the species in great quantities, and it has been gathered and distributed to a greater or less extent by other botanists. The species is indeed widely diffused throughout Great Britain, from the Shetland Isles in the north to the mountains of Kerry in the south-east of Ireland, and ranges from about 250 to 2900 feet. I was therefore surprised to find that Dr. Lees neither was aware, nor suspected, that it was known as a British species previous to the date of its discovery at Malham Cove.

It may be the case that no recent work on, or catalogue of, the British Mosses makes mention of this and other species which were gathered, recognised and distributed before the publication of such works. It would have been extraordinary if such works had been complete, but it by no means follows that the unpublished is identical with the unknown. However this may be, the notice of *Fontinalis gracilis* as a British species, given in last month's *Naturalist*, is not the first which has appeared: there is an earlier one in a list of mosses new to the county of Forfar, which list was published so long ago as 1869.

It may be useful to know that the plant grows in streamlets, large springs, rarely in lakelets, and more rarely still, if at all, in streams entitled to the name of rivers. It will be somewhat difficult for a fairly practised eye to mistake it for anything but a *Fontinalis*. Diligent search in the field, and careful examination of small forms supposed to belong to *F. antipyretica*, will no doubt enlarge the area of its distribution south of the Tweed. I may state that I have specimens of the same plant from Wahlenberg's herbarium, named *F. minor*, and that I think this name rather than Lindberg's should be used.

LEPTOTRICHUM (*Trichost.*) *tortile*, Schrad.—Schimper describes this species as having a compound annulus; Wilson describes it as having a simple one. European and American specimens show that Schimper is right; Castle Howard specimens show that Wilson is right also. And yet the annulus is much more constant in its character than almost any other organ of a moss. Does not this point to a suspicion that our British plants may belong to a different species than some of the European and American forms? I should be much obliged if anyone would send me specimens of this moss from any quarter.

The Manse,
Ferns, near Brechin.

Short Notes and Queries.

ORNITHOLOGICAL NOTES.—The severe frost which we have witnessed during the past three weeks has brought many rare birds here to our sheltered districts. Several flocks of ducks, chiefly wigeons, have been seen at Roundhay Park, also two or three water-rails. A great many bramblings, fieldfares, and redwings were also observed. I saw a redwing on the 13th of this month in one of our public streets (North-street). I almost trod upon the bird, for so eagerly was it eating a piece of bread that it did not fly away until I was within a yard of it. Birds at this season become very bold. Robins and sparrows will come into the houses if the doors or windows be left open.—WALTER RAINES, Leeds, December 26th, 1878.

BREEDING OF HAWFINCH.—It is not without pleasure I have to record the breeding of the hawfinch in this district during the year 1878. I was at Mr. P. Dalton's, Bingley, on the 10th inst, when he showed me an immature hawfinch which had been caught at Myrtle Grove, Bingley. The old birds were observed flying about in the neighbourhood all spring, but the nest, as far as I could ascertain, was never found. I may also add that had not the Protection Acts been in force, in all probability the birds would have been shot. This is the only instance I have known of this species breeding in this district.—E. P. P. BUTTERFIELD, Wilsden, January 14th.

A NEW BRITISH SPECIES OF THE GENUS *Achorutes*.—On the 13th Oct. last I found two specimens of *Achorutes similatus*, Nicolet, amongst dead leaves in the garden, in company with *A. purpurescens*, Lubbock. I have since searched for it, but have not been able to find any species of *Achorutes* in the same place, doubtless owing to the severe winter. Sir John Lubbock, in his "Monograph of the Collembola and Thysanura," gives *A. similatus* as being found in Switzerland and France. Nicolet's description (Mem. Soc. Helv. 1842) is as follows :—"Entierement d'un gris plombé, non métallique, plus pâle en dessous, avec quelques lignes longitudinales jaunes très-peu apparentes sur le dos. Deux petites taches du même couleur sur le cou. Yeux d'un noir terne. Queue pale. Longuer 1-2 millim. sur les eaux stagnantes en été, et dans les terres humides, vers la fin de l'automne et en hiver; vit en société, très commune." My specimens agree with this description in every particular excepting the faint yellow lines on the back; these I did not see, but think there can be no doubt as to the identity. The antennæ are short and thick, and do not taper to the apex as in *A. dubius*. *A. similatus* differs from *A. armatus* and *A. purpurescens* by the absence of abdominal hooklets, and also by its uniform dull leaden-grey colour. *A. Texensis* of Packard, and *A. nivicola* of Fitch, are similar in colour, but both possess abdominal hooklets.—GEO. BROOK, TER., Huddersfield, Jan., 1879.

Seligeria acutifolia IN YORKSHIRE.—I have to announce the discovery of the typical form of *Seligeria acutifolia* of Lindberg, on dry limestone rocks at Arncliffe, Yorkshire, in June, 1868. I gathered the moss as a form of *S. pusilla*, but I have lately been giving my collection of *Seligeria* a thorough re-examination, and found that it agreed in every particular with Prof. Lindberg's description. The typical plant has, I believe, hitherto only been known to occur in Scandinavia, but the variety β *longiseta* was gathered near Buxton, Derbyshire, by Mr. Wilson, so far back as 1831, also as a form of *S. pusilla*. I have sent specimens to Mr. Fergusson, who writes to say that he entirely agrees with me in referring them to Prof. Lindberg's *S. acutifolia*, and also that they are decidedly the typical form.—JOHN WHITEHEAD, Dukinfield, 18th January.

RANGE OF *Luzula spicata*, DE CANDOLLE.—The following notes on the above are from unexceptionable sources :—From Dr. Dickie's "Flora of Aberdeen," &c. : "Upon the large boulders by the roadside between Bridge of Invercauld and Castleton : height 1150 feet." Mr. Watson, *Cybele Britannica*, "*Luzula spicata*, De Cand. Descends to 550 or 500 yds. (1500 feet) in East Highlands." The above in reference to "note" by Dr. Buchanan White in January No. of *Naturalist*, mentioning a footnote of Mr. F. A. Lees in Mr. Wood's paper on Cumberland Plants.—A. BENNETT, Croydon, Surrey, Jan. 2nd.

RANGE OF *Luzula spicata* IN SCOTLAND.—Dr. White is doubtless quite right in his correction that this alpine rush is, as a matter of fact, found as low as 1000 feet in the very north of Scotland. In my note to Mr. Wood's paper, intended to point a caution, by a mere *lapsus calami* I wrote "Britain" for "England." Please read the word as "England," and my observation is correct ; and the reasons for doubting if *Luzula spicata* really occurs on Blake Fell—quite a minor elevation—remain forcible. In Westmoreland its range is very limited, as is *Myosotis alpestris* and some other north of England plants ; and in southern latitudes one does not expect or find alpenes to have such a wide vertical range as in northern latitudes. A descent to 1000 feet at lat. 57° (Braemar district is about that) would about correspond thermometrically and climatically with 1900 or 2000 feet in north-west Yorkshire, so that, looking at the matter in this light, a plant that nowhere in Braemar descended below 1000 feet, I should not expect to descend below 1800 feet in Yorkshire. Of course in each case we must leave out the casual, accidental occurrence of a single specimen or so washed down to a low level by some mountain rill in spate, as such occurrences would vitiate any calculation as to the climatic range of any plant, for it is mainly the temperature that determines a botanical zone. The range of heat of each botanical zone of 900 feet in Britain is about 3 degrees between its lowest and highest limit, but there is also a diminution for latitude independent of elevation ; so that, small as is the latitudinal diminution in temperature of sea-level in Britain (with its sea-influence climate), compared with

what it is in central Europe, it is yet, between the extremes of 50 degrees (Scilly) and 59 degrees (Orkney), very much more than equivalent to one zone in altitude. The result of this is necessarily a successive overlapping of the zones as we proceed from south to north, the zone at sea-level changing from the lowest limit (highest in temperature) of inferagrarian at lat. 50 degrees, to lowest limit of mid-agrarian at $53\frac{1}{2}$ degrees, and to super-agrarian at about 57 degrees. To express this in other words, we may say that the altitudinal limit of the lowest zone declines from 900 feet above the sea at Scilly to sea-level at Lincoln; whilst the upper limit of the mid-agrarian zone, which is 900 feet above the sea in Derbyshire, declines to sea-level in Forfarshire; and the upper limit of the super-agrarian zone, which begins at 900 feet, and terminates only at 1800 feet, in Yorkshire and Westmoreland, declines to about 1000 feet in the Scotch Highlands, and touches sea-level (almost) in Caithness, and (quite) in Shetland. This digression may serve to explain to some readers of the *Naturalist* a matter not understood by botanists so well as it ought to be, and give an inkling why *Luzula spicata* may be found at 1000 feet in Sutherland, and yet hardly a possible occurrence on Blake Fell (960 feet) in Westmoreland, for be it noted that I do not for a moment suppose Dr. White meant to advance the fact of its low descent in the Highlands as a reason or argument for its descending so low in England.—F. ARNOLD LEES, Jan. 4th.

Rainfall for December.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·39	13	32·54	* 33·57	29	0·70 †
LEEDS ... (H. Crowther) ...	183	1·41	17	...	...	20	0·52 ‡
HALIFAX... (F. G. S. Rawson)	360	2·71	16	45·44	61·73	...	... §
BARNSELY ... (T. Lister) ...	350	1·54	16	26·01	34·31	25	0·41
INGBIRCHWORTH (do.)	853	1·80	15	38·47	50·64	31	0·42
WENTWORTH CASTLE (do.)...	520	2·12	16	28·23	40·48	28	0·24
GOOLÈ ... (H. F. Parsons) ...	25	1·52	15	24·01	26·00	25	0·72 ||

* This is the average to date for 12 years, 1866-77.

† No. of wet days in 1878—176. Average ditto, 1866-77—189.

Amount of heaviest fall, 1878—0·82. Date of do. Aug. 4.

‡ This falling as snow=5·20 in.

§ Rainy days in 1878—169. Average of do. for 10 years, 47·17.

|| Melted snow.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Similar observations to those given in the January *Naturalist* have been made in this extraordinary season. The flight and movements of birds yielded interesting observations; many wild geese were recorded Dec. 12, and other flights since, passing over or near to Barnsley, a heron on the 15th, also large sea-gulls on Jan. 15th. Mr. W. Talbot recorded redshank at Kirkthorp Jan. 16th; a blackbird with white-streaked neck and breast was brought to Mr. Lister on Christmas Day; it is well cared for by a friend. It will be curious to see what change will be developed in confinement. Three wagtails, more or less pied, have been seen. A hawfinch was received from Mr. C. Wemys, of Cannon Hall. Jan. 6th.—T. LISTER.

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 3rd.—Lecture on "Poisonous British Plants," by the Rev. T. Dickin. The author mentioned and described the principal poisonous species of flowering plants found in Britain, with the symptoms which they produce in the animal body, and the appropriate treatment.—H. FRANKLIN PARSONS, Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting Dec. 30th, Mr. S. J. Capper, president, in the chair—A paper was read by Mr. Benj. Cooke, entitled "Entomological Mares' Nests," in which he facetiously alluded to several national and other needless alarms caused by the reported importation of foreign devastating insects. Several manufactured varieties of lepidoptera were exhibited, and also *Tortrix dumetana* by Mr. Roxburgh, &c.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, Mr. J. Whitehead, president, in the chair.—A conversation took place with regard to the collection of British mosses which the members desire to present, in the name of the society, to the Free Reference Library, and resolutions were passed for giving effect to the decision already arrived at. A committee was appointed consisting of the president and five members of the society, to undertake the work. Mr. C. P. Hobkirk, F.L.S., Huddersfield, and Dr. J. S. Wesley, Wetherby, were elected corresponding members of the society. The president mentioned the fact of his having gathered *Seligeria acutifolia*, Lind., a species not hitherto known as British, at Arncliffe, in Craven. Mr. Rogers, hon. secretary, called attention to a species of *Pottia*, gathered at Southport by Mr. Percival, and understood at the time of collection to be *P. Wilsoni*, B. and S. He believed it would turn out not to be that species, but the much more rare *P. littoralis*, Mitt. The president exhibited specimens of *Phascum bryoides*, Dicks., in beautiful condition; also *Hypnum crassinervium* and *H. chrysophyllum*, gathered by him on New Year's Day at Miller's Dale. Dried specimens were shown by Mr. Holt of *Dichodontium pellucidum*, var. *serratum* (*Dicranum flavescens*, Brid.) from the Isle of Man; and by Mr. Wild of *Gymnostomum commutatum* (*Weissia commutata*, Mitt.), from the only locality for this species at present known, viz., Nant-y-Fidd, near Wrexham. *G. commutatum* was first found by the late Mr. J. E. Bowman, of

The Court, near Wrexham, a distinguished botanist, many years ago ; and during the last summer it was rediscovered in the old locality by Mr. E. M. Holmes, of London, from whom the specimens now shown were received.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, December, Mr. James Spencer, V.P., in the chair.—The chairman made some observations concerning the uses of the microscope in geology, and showed a number of microscopic objects, including the following :—*Dadoxylon*, from the Yoredale strata of Hebden Bridge ; *Sigillaria organum* from “baum-pot” over hard-bed coal ; *S. vasculare*--the whole plant from pith to bark about 3in. diameter, and a slice of a smaller one for microscopic examination ; *Lyginodendron Oldhamium*, *Lepidodendron selaginoides*, fern stems, several slides of spores (two new and undescribed), all from Halifax coal strata. Mr. T. Hirst exhibited the following birds, viz : two pairs of snipes, pair of mallard ducks, two pairs of grebes, two pairs of bluecaps, and one redwing.—J. OGDEN, Hon. Sec.

STAINLAND NATURALISTS' SOCIETY.—Annual meeting and dinner, Jan. 6th, Mr. J. E. Garside, president, in the chair.—The officers for the coming year were elected as follows :—President, J. E. Garside (re-elected) ; secretary and treasurer, Wm. Hy. Stott ; delegate to the Yorkshire Naturalists' Union, C. C. Hanson. After dinner the secretary read the report, showing the society to be in a flourishing condition. Twenty-one volumes have been added to the library during the last year. Mr. Garside had received the great northern diver from A. G. Sunderland, Esq., Coley Hall, he having shot it on Oram Mere. Other members reported the occurrence of woodcock, snipe, kingfisher, and woodpeckers having occurred in the neighbourhood, also the great destruction of bird life by the severe weather.—W. H. STOTT.

WAKEFIELD NATURALISTS' SOCIETY.—Annual meeting, Jan. 2nd, Mr. Wilcock in the year.—The report of the past year was read. The following were appointed officers for the ensuing year :—Mr. J. Wainwright, F.L.S., re-elected president ; Mr. J. W. Shaw, corresponding secretary ; and Mr. H. Sims financial secretary. Mr. E. B. Wrigglesworth was appointed delegate.

YORKSHIRE NATURALISTS' UNION.—The seventeenth annual meeting was held at the Mechanics' Institute, on Saturday afternoon, Jan. 11th, when there was a large attendance of members. The chair was occupied by the president, Mr. H. Clifton Sorby, F.R.S., of Sheffield. The report showed that the progress of 1877 had been fully maintained in 1878, and that the Union was in a sound and healthy condition. All the societies had kept up their connection, and two new ones had been added--Batley Field Naturalists, and Driffeld Literary and Scientific. The publication of the Transactions for 1877 was referred to. The map was reported to be in progress, Mr. E. Filliter, C.E., F.G.S., having under-

taken to fill in the contour-lines, Prof. Green and Mr. H. H. Howell (of the Geological Survey) assisting with the geological portion. The number of subscribers was reported as having increased from 104 to 164. It was pointed out that the minimum subscription was fixed as low as 2s. 6d., in order to ensure a wide circulation for the Transactions, and to place them within reach of every purse. The balance-sheet showed an income of £68 14s. 9d., and an expenditure of £47 9s. 11d. The amount of cash available for the publication of the reports for 1878 was £14, in addition to which £20 was owing for subscriptions. The reports and balance-sheet having been adopted, the excursions were fixed as follows : Easter Monday, April 14th, Ingleton ; May 10th, Harrogate ; Whit Monday, June 2nd, York for Askham Bog ; Saturday, July 19th, Hebden Bridge ; Monday, Aug. 4th, Doncaster ; Saturday, Sept. 6th, Selby for Riccall Common. The annual meeting to be held at Huddersfield on the 17th of January, 1880. All the officers were re-elected, viz., Mr. H. Clifton Sorby, F.R.S., &c., Sheffield, president ; Messrs. Geo. Brook, ter., F.L.S., Huddersfield, and Wm. Denison Roebuck, Leeds, secretaries ; and Messrs. A. Crebbin of Bradford, and C. W. Richardson of Wakefield, auditors. The sections reported their officers as follows :—Vertebrate Section ; Mr. T. Lister, Barnsley, president, and Mr. W. E. Clarke, Leeds, secretary. Conchological Section : Mr. John Conacher, Huddersfield, president, and Mr. Joseph Wilcock, Wakefield, secretary. Entomological Section : Mr. Wm. Prest of York, president, and Mr. S. D. Bairstow, of Huddersfield, secretary. (It was decided to publish a list of the lepidoptera of the county, as known up to the present time, which Messrs. G. T. Porritt, F.L.S., of Huddersfield, and Wm. Prest of York, were appointed to compile.) Botanical Section : Rev. Wm. Fowler, M.A., Liversedge, president : Dr. H. Franklin Parsons, F.G.S., Goole, and Mr. William West, Bradford, secretaries. Geological Section : Prof. A. H. Green, M.A., F.G.S., Leeds, president, and Mr. James Spencer of Halifax, secretary. On the motion of the president, seconded by Mr. W. E. Clarke, a vote of thanks to the committee of the Leeds Mechanics' Institute for the use of their building, at a merely nominal charge, for the holding of an exhibition, was carried unanimously. The meeting then adjourned to the Albert Hall, where the president delivered the annual address, which was of unusual value and very great interest. The latter portion gave an account of Mr. Sorby's own researches into the colouring matters of animals and plants—a subject which is peculiarly his own. A vote of thanks was accorded to Mr. Sorby for his address, and his services in the chair, on the motion of Mr. Thomas Hick, B.A., B.Sc., seconded by Mr. E. W. Chatwin. In connection with this annual meeting, a very extensive exhibition of natural history specimens and scientific apparatus was organised and held within the Mechanics' Institute from the 10th to the 17th January. This exhibition is the subject of a series of special articles, which will appear in future numbers of the *Naturalist*.—WM. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- Feb. 4. Bishop Auckland Naturalists' Club.—Liversedge Naturalists'.—Leeds Naturalists' Club, &c.
,, 16. Manchester Cryptogamic.
,, 11. Huddersfield Literary and Scientific; Paper, "The Mechanism of Thought," Dr. Herbert Major, of Wakefield.—Leeds Naturalists' Club, &c.
,, 12. York and District Field Naturalists' Club.
,, 14. Goole Scientific; Paper by T. Rowney, of Hull.—Huddersfield Scientific Club; Paper, "Ichneumons," S. D. Bairstow.
,, 18. Leeds Naturalists' Club, &c.
,, 20. North Staffordshire Naturalists' Field Club, at Burslem.
,, 24. Lancashire and Cheshire Entomological.
,, 25. Huddersfield Literary and Scientific; Discussion on "Animal Intelligence," by the President (C. P. Hobkirk, F.L.S.) and others.—Leeds Naturalists' Club, &c.
,, 28. Goole Scientific; Papers by Wm. Gardiner and Dr. H. F. Parsons.

COMMUNICATIONS RECEIVED from Rev. J. Fergusson, Rev. W. Fowler, Jno. Whitehead, Geo. Stabler, J. S. Wesley, M.B., &c.

N.B.—Owing to a pressure of matter, we have been compelled at the last moment (although in type) to omit until next month our notice of Bot. Exch. Record Club Report, as well as other Notes, &c.

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AT a Meeting of the ENTOMOLOGICAL SECTION of the Yorkshire Naturalists' Union, held at Leeds on January 11th, it was decided to publish a LIST, with localities, &c., of the Lepidoptera of the county of York. Its compilation was placed in the hands of Mr. W. Prest, of York, and myself. May I ask, therefore, that every lepidopterist who has collected in any part of Yorkshire will kindly send list with localities of all the species noticed, with any notes that may be of use, to me, as early as convenient. I need scarcely say that all such assistance shall be fully acknowledged.

GEO. T. PORRITT,

Highroyd House, Huddersfield.

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No. XLIV.

MARCH, 1879.

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Original Articles.

NOTES ON YORKSHIRE MOSSES AND HEPATICS.

BY G. STABLER.

WHILST looking over some recent numbers of the *Naturalist*, it occurred to me that it might be of interest to its readers if I noted down a few of the rarer mosses and hepatics which have been gathered in the Dent valley, or more correctly speaking, in that part of Yorkshire to the left of the Dee, and which joins Westmoreland.

The lists of Yorkshire mosses and hepatics in my possession are the following:—the *Musci* and *Hepaticæ* of Teesdale, found by Dr. Spruce; the list of mosses in Baker's "North Yorkshire"; and Hobkirk's "Mosses of the West Riding of the County of York" (1873). I will therefore abstain from mentioning any found in the foregoing lists.

I have the permission of my friend Mr. Barnes to say that on the 27th of December, 1872, he gathered *Grimmia conferta* on the hills growing on a crumbling kind of dark-coloured rock or clay. In the same year I also found *Sphagnum teres* and *Habrodon Notarisii*—the latter on an ash near the river, and since that time on sycamore near the same place.

Dr. Spruce's list is the only one of the three above mentioned which includes *Hepaticæ*, and being a record of plants observed by my eminent friend during *one* journey in *one* valley in the county, it is necessarily less comprehensive than the lists of the other two botanists, and this is why I have to enumerate more hepatics than mosses.

In the year 1872 I paid two visits to Dent, and along with many other species, were collected the following:—*Plagiochila spinulosa*, N. ab E.; *Jungermannia Genthiana*, N. ab E.; *J. pumila*, With.; *Saccogyna viticulosa*, Dum.; *Mastigobryum trilobatum*, N. ab B.; *Lejeunea minutissima*, Dum. (on trees); *Frullania fragilifolia*, Tay; *Metzgeria conjugata*, Lindb.; *Reboulia hemisphrica*, Radd.; *Pellia calycina*, N. ab E.

On the 1st of September, 1877 (I will not disguise my feelings on the occasion) I was delighted to find *Lejeunea hamatifolia* growing in the same district; and this leads me to think that I could not find a more fitting opportunity to place on record something I have done. It is this: Dr. Moore, of the Royal Botanic Garden, Glasnevin, with his usual liberality sent me fine living specimens of *Dumortiera irrigua*

N. ab E., and on my next visit to Dent to get more of the *Lejeunea hamatifolia* (alas! it is rather scarce), I planted a fine healthy specimen of the *Dumortiera*, which I trust will thrive and multiply. This is now about a year ago.

I am not aware that *Edipodium Griffithianum*, Schw., has been found in Yorkshire, but two or three years ago I found the plant on the western slope of Barbon Fell, about two miles from the Yorkshire boundary.

In a recent number of the *Naturalist* Mr. Boswell mentioned my name in connection with *Hypnum imponens*, pointing out that the late Mr. Wilson was most probably the first to identify the moss as a native of Yorkshire. The specimen I received from him was collected on Strensall Common on 8th September, 1869. On the 13th of the same month he wrote to me as follows:—"I made last Tuesday what seemed to me a desperate attempt at another expedition to Strensall Common. The occasion for selecting that place was this, viz., that I had some years ago picked up and kept, without knowing its value, a small patch of *Hypnum imponens*, and as its detection elsewhere is confined to a heath in Sussex, where Mr. Mitten gathered it about the same time, I was naturally desirous to gather more before the Common had become arable land.....The moss being also in better state than the Sussex specimens, though without fruit."

Paludella squarrosa.—As there is only a doubtful habitat given for this moss in Hobkirk's list, I think we may come to the conclusion that this beautiful moss has become extinct in these islands. On a packet containing a specimen of this moss from Mr. W. Wilson, a few years ago, he wrote "long extinct—always scarce." This remark applied to Knutsford Moor. As Mr. M. B. Slater and myself were most probably the last persons who gathered this plant in England, a remark on the subject may not be out of place. In the year 1868 and on the 7th of June, Mr. Slater of Malton accompanied me to Terrington Car, where he had gathered the plant in plenty in 1855. We found the place drained, and producing luxuriant grass, amongst which in one place were a few straggling stems of *Paludella squarrosa*, and near to it was *Hypnum nitens* in greater quantity. I have since visited the place, and could find neither the *Paludella* nor the *Hypnum*.

Amblystegium confervoides, so far as I know, has not been published as found in Yorkshire. In August of 1871 I found it in the neighbourhood of Hawnby (Bilsdale) growing on embedded stones amongst hazel bushes, &c., below a scar the name of which I cannot give, but

which I think formed a part of the eastern side of the Hambleton hills.

On the 26th of July, 1876, whilst on a ramble in the North Moors with my late lamented friend, Mr. S. Anderson of Whitby, I found *Jung. curvifolia* growing on decayed wood in Blaeberry Gill, and in 1877 *Madotheca lævigata* was gathered by myself in the Shaw Wood, at Castle Howard, only in one place.

THE WHARNCLIFFE *DICRANUM*.

BY REV. J. FERGUSSON.

It seems to me to be an exceedingly difficult matter to determine this moss; and that any decision given about it will be likely to give rise to diversity of opinion among botanists. Unfortunately it is in a barren state, and the two or three stems which I have of it, and which were kindly sent me by Mr. Hobkirk, are so miserable—only fragments apparently,—that I have the greatest hesitation in hazarding an opinion as to the species to which they belong; and this notice is intended mainly to call out the views of others regarding them. To the naked eye they look not unlike *Dic. scoparum* var. *rupestre*, if the specimen which Mr. Boswell has had the goodness to send me be an authentic one; but when placed under the microscope they are seen to have an areolation of a type totally different from that which any form of *Dic. scoparum* can possibly have. On first seeing Mr. Hobkirk's mounted specimen of the Wharncliffe plant, which could not be dissected, and did not show the nerve structure or the bases of the leaves sufficiently, I supposed it to belong to *D. fuscescens*. On receiving his unmounted stems, and being at once struck with the remarkable papillosity of the pagina of the leaf, I concluded that they should be ranked with *D. montanum*—a species found in several places in England and Scotland. On more careful examination I find that this papillosity is not confined to *D. montanum*, but is manifest in undoubted forms of *D. fuscescens*, *D. fulvum*, and *D. Muhlenbeckii*. From *D. Muhlenbeckii* the Wharncliffe plant differs in the nerve being very rough, not quite or nearly quite smooth on the back, and in other particulars. *D. fulvum*, again, has a very broad, thick, flat nerve occupying nearly a third of the base of the leaf, the short quadrate cells descend almost or quite to the base of the leaf; and the leaf itself is quite different in form and direction. From *D. montanum* our plant differs in the dark green colour, absence

of tomentum (judging from my specimens), firm, not soft, falcato-second leaves which are wider at the base, furnished with larger, laxer auricles, and a nerve much less depressed ; besides it grows on rocks, a thing which *D. montanum* does not do, except very rarely. From the ordinary forms of *D. fuscescens* it differs much more decidedly than from *D. montanum*, in being almost quite if not wholly destitute of the long narrow cells which advance upward from the base to about one-fourth the length of the leaf, and in the pagina being more decidedly papillose, but in these particulars *D. fuscescens* varies exceedingly. The nerve of the specimens gathered by Dr. Parsons is much more that of *D. fuscescens* than of *D. montanum*. Whilst fully recognising the close affinity of the Wharnccliffe moss with *D. montanum*, of which it may only be a rock form, I have the greatest difficulty in getting clear of the idea that it is closely related to specimens which I have from various quarters, which differ in aspect most decidedly from every form of *D. montanum* which I have seen. Such forms have been gathered at Dunoon by Dr. Stirton ; at Pateley Bridge, Yorkshire, by Mr. J. S. Wesley ; at Staly Brushes by the late Mr. Hunt ; in Mayo, Ireland, and in various places throughout the kingdom. To me it seems that these cannot be easily included in *D. montanum*, but belong fully as much to *D. fuscescens* ; and it may be as well to delay deciding definitely what they are until better and more abundant specimens are obtained, or to regard them in the meantime as belonging to a doubtful variety, if not species, and to let it pass under the name of *D. saxicola*.

A FORTNIGHT IN THE FENS.

BY G. T. PORRITT, F.L.S.

WHEN collecting in the New Forest last year with the Rev. T. W. Daltry, M.A., F.L.S., of Madeley Vicarage, we came to the conclusion that, as for six or seven years we had kept pretty well to wood working, and had "done" some of the most noted localities of that character, it would be as well to change the nature of the ground for our excursion this year. Accordingly we decided to try "the fens."

Of these there are now three portions existing in England ; first, a fair extent, Mr. F. D. Wheeler tells me, still undrained about Holme, in Huntingdonshire (the next station to Peterborough, on the Great Northern line) ; next, Wicken Fen, a small piece of perhaps a mile and a half square, the last relic of the Cambridgeshire fens ; and

lastly, the Norfolk fens, all of which must be approached through Norwich. These are very extensive, stretching along the course of the river Bure, and its tributaries the Ant and Thurne, and the "broads" or lakes they form. These for the most part have to be worked by boat, being more water than land, but here and there spots are to be found where the ground is pretty firm, only it is necessary to take care or you'll get "bogged." These great stretches of fen are very similar in character. Horning and Ranworth, which are adjoining parishes, have been worked very considerably, but as yet Thurne river and its great "broads" are wholly unworked, probably from being less accessible, and also very wet, though no doubt they would prove as prolific as any of the others.

To return to ourselves. We had arranged to go to Ranworth in preference to the others, as we were very anxious to take *Nonagria brevilinea*, which occurs there only. We had, however, "reckoned without our host," as on writing for lodgings we were told we could not be accommodated, and the only other place in the village (which is composed of about twenty houses only) where rooms were let, was also taken by other lepidopterists. We had written for and obtained permission to work the fens from S. Gurney Buxton, Esq., of Norwich, but after all had to give up Ranworth. We then settled on Wicken, and there our application for quarters was fortunately successful.

I left Huddersfield on Monday morning, the 22nd of July, by the 10-5 Great Northern train for Peterborough, expecting to be joined by Mr. Daltry at Grantham. He had not turned up, however, when I reached Peterborough, so I went forward as soon as possible to Ely, and as I was evidently before him there, and knowing that the next train would not arrive for more than an hour, I took the opportunity of visiting the Cathedral, and was so charmed with its beauty, particularly the interior, which is most grand, that I felt grateful for the cause which had given me the treat. Soon after reaching the station, the train arrived, and with it my friend. We at once engaged a conveyance, and were soon on our drive to Wicken, which place we reached about seven o'clock. By the time we had seen our rooms, had some tea, and unpacked our lamps, nets, and other collecting apparatus, it was getting dark; still, our longing for a first experience of fen-collecting was so great that we turned out, and induced a boy who was at play with a group on the green in front of the house, to shew us the way to the fen, which we were glad to find was within very easy walking distance, though by the time we reached

the ground it was almost quite dark. However, finding the fen was tolerably dry, we lit the lamps and struck into the thick of the reeds, sedges, &c. : and we had evidently hit upon a good place for the local *Nonagria Hellmanni*, as we soon netted a few nice specimens of it. Whilst wandering about, the darkness had become intense, and we were a little surprised to be visited by a man, who turned out to be the village policeman. Instead of regarding us as suspicious characters, however, he seemed to know pretty well what we were about, and very kindly put us into the right way of collecting, by fetching a long pole, which he stuck upright in the ground, and then fastened our lamps to it at a distance of six or seven feet from the ground. This we found was the orthodox way of collecting in the fens, all other methods (at night) being of comparatively little good. Some wonderful lamps, too, are used by the fen collectors; usually they are from twelve to eighteen inches square, and have generally four large burners and reflectors. When a number of these lamps are on the fen at one time, as is often the case, mounted at moderately equal distances apart, the fen has somewhat the appearance of being lit up with street lamps. That used by Mr. Wheeler, of Norwich, is a monster indeed, and after seeing it we were no longer astonished at his marvellous success with the fen moths. When on the flat fen they of course give out a strong light for a long distance all around, and on favourable nights moths in the greatest variety—Nocturni, Geometræ, Pseudo-Bombyces, Noctuæ, Deltoides, Pyrales, Crambites, and Tortrices come up in swarms. A great many species settle at once on the glass panes, others fly round and round, and are easily netted. It is, however, very uncertain work, as on some nights, from certain conditions of the atmosphere, hardly a moth will come, whilst perhaps on the very next they come in shoals. On some of the nights we were there the sport was most exciting. This we found to be the case after a warm, dry, but not sunny day; whereas after a wet day, or when a mist rose on the fen, light was of but little use. Our first night was one of the former, and we were in great glee; but being tired after our long journey, we did not stay out very late, but returned to our lodgings, to dream of the wonders we were going to do every night after,—dreams, however, which, as usual, were not altogether realised. Perhaps it will be as well to say here that the moths come to the lights in the greatest numbers from ten o'clock at night to about two o'clock in the morning, midnight being usually the very best time.

On setting our captures next morning, we found we had taken

Nonagria Hellmanni commonly, along with *Leucania pudorina*, and a few lovely *L. phragmitidis*. An *Acidalia* which came very freely was *immutata*; this delicate-looking moth we afterwards found was in the greatest profusion all over the fen. *Lithosia griseola*, too, was in capital condition and very common, with many other species.

Having finished our setting, we went out to ascertain what the fen looked like by daylight. We found it was composed of a rich variety of vegetation, and indeed was as gay as a garden with bright flowers of all colours. Amongst the plants we recognised were sedge, reed, *Sagitta sagittifolia*, *Lythrum Salicaria*, *Thalictrum flavum*, *Spiræa Ulmaria*, *Butomus umbellatus*, *Eupatorium cannabinum*, *Vicia*, *Convolvulus major*, *Peucedanum palustre*, *Angelica sylvestris*, *Symphytum officinale*, *Valeriana officinalis*, *Epilobium hirsutum*, frogbit, and many others. In the ditches the great water lily was abundant in full bloom, its large, lovely white flowers looking like stars on the surface of the water. This varied vegetation altogether forms a tall and dense herbage, and, fortunately, is farmed profitably by the holders of the fen land. I say fortunately as a lepidopterist, for, had it been useless, the whole of Wicken Fen would doubtless long since have been drained and properly cultivated, as indeed the great bulk of it (along with all the old surrounding fens) already has been, and as all will be sooner or later. The fact that the Fen hay, as it is called, can be used to advantage, however, and made to pay, seems to deter some of the holders from going to the necessarily great expense of draining. The dried sedge is used for thatching very extensively in the district, nearly the whole of Wicken—houses, stables, sheds, and outhouses of all descriptions being closely thatched to the depth of towards a foot with this material. The older thatches, too, are often grown over with a thick layer of moss.

Turning from the plants to the lepidoptera, we found there was comparatively little to be done in the daytime in the fen. Odd specimens of *Hyria auroraria*, *Hydroelia unca*, *Liparis salicis*, with a few Tortrices and Crambites, were about all we picked up as imagoes. Larvæ of *Eupithecia valerianata* were plentiful in the flower heads of *Valeriana officinalis*, and those of *Simyra venosa* occurred on sedge, but little else. In the evening we went down again with our lamps, when moths were so abundant, in contrast to their apparent paucity in the daytime, that we marvelled where they had all been hid. The species taken the previous night occurred again, and in addition to those previously mentioned, *Nonagria despecta*, *Miana arcuosa*, *Nudaria senex*, *Chilo phragmitellus*, and *Scoparia pallida* were

all abundant. *Lithosia stramineola* occurred now and then amongst a lot of its brother *griseola*, and *L. complanula* also accompanied them.

Mr. Daltry had sugared early in the evening. This, in the fens, takes a good deal more time and labour than it does in the "rides" of a wood, for, as you will at once have called to mind, there are no tree trunks on which to brush the beguiling liquor. We found the method there was to tie together several of the stems of the reed, or sedge, and put the "sugar" on the knot formed by the tie. In this way *Apamea fibrosa* was taken pretty commonly, but little else visited the sugar this night.

(To be continued.) p 129

Short Notes and Queries.

Deilephila galii NEAR BRADFORD.—I have just had the pleasure of adding to my collection a specimen of *D. galii*. It was taken at Wibsey-Slack last August, and is in very fair condition.—J. W. CARTER, Manningham, Bradford, Feb. 17th, 1879.

Linota linaria AT COTTINGLEY.—On the 4th February last, I saw a mealy redpoll (*Linota linaria*) feeding upon the seeds of the alder, by the side of the river Aire, near Cottingley Bridge. It was in company with lesser redpolls (*Linota rufescens*) and as I afterwards found siskins. So hoary did it appear at the first blush, that I took it to be the Arctic form of redpoll (*Linota Hornemannii*), but I subsequently satisfied myself that it was the above mentioned species, though in the absence of any clear differentiating features, it is very difficult to identify them beyond the possibility of a doubt, without actual examination. It was, however, considerably lighter coloured than the examples of mealy redpolls shot at Manywells last year. As my brother and I were going to the Exhibition on the 11th January last, we saw a strange bird which we took to be a grey shrike, flying over the railway lines to the south of Shipley Station. One of this species was shot a few years ago in the Goit Stock Valley, and after passing through several hands ultimately got into the possession of Mr. P. Dalton, Bingley.—E. P. P. BUTTERFIELD, Wilsden, Feb. 6th.

SCHIMPER'S SYNOPSIS.—As I am unwittingly the cause of the present discussion in the *Naturalist* on the mistakes in Schimper's Synopsis, through making the remark that *S. tristicha* was not only new to Yorkshire, but new to England also, I think I can claim a right to have a say in the matter. I have also another reason, and that is, that my name, as the discoverer of several rare mosses, is often omitted or misplaced in the

work above mentioned. The first case I will take is that of *Atrichum crispum*, as I was never more surprised than to find that Dr. Wood was given as the first detector of the moss in Britain in 1860. I first gathered the moss at Stayly Brushes in 1859, and sent it to my lamented old friend, John Nowell, to name for me, when he wrote to inform me that he had known the plant for several years near Todmorden, and was unable to name it, but he had submitted specimens to Mr. Wilson, who said it was a form of *A. undulatum*. In the autumn of 1860 Dr. Wood and I made arrangements for gathering *Climacium dendroides*, in fruit in this district, when he told me that Mr. Wilson had sent him a mnioid moss from Oakmere, Cheshire. He described the moss to me, and then I told him that it was growing in plenty at Stayly Brushes, which we were then passing. He told me that he wanted a lot of it for Dr. Schimper, and sent his son the following week to go with me to gather it. He sent specimens to Dr. Schimper under the name of *A. tenellum*, and new to England; but Schimper wrote back to say that it was *A. laxifolium*, Wils., and new to Europe. The other cases I beg to mention are *Bryum turbinatum* and *B. calophyllum*. I deny altogether, as a wilful misstatement, that I and R. Scholefield detected the moss at the place mentioned, as the locality was pointed out to me by R. Gordon. In concluding this note, I assert, without fear of contradiction, that Dr. Schimper has depended mostly on Dr. Wood for his information on British mosses for the Synopsis.—J. WHITEHEAD.

“THOUGHTS ON ORNITHOLOGY: Suggested by the Exhibition of the Yorkshire Naturalists' Union. By H. C. Hewetson, M.R.C.S.” Leeds, Chas. Goodall, Cookridge-street, price 6d.—This is a pleasant little review of the ornithological department of the exhibition, preceded by some remarks on the study of natural history in general, and of ornithology in particular. Several pages are occupied with a critique upon the “setting” of preserved birds as generally followed, “mere mummies of a former existence,” and how, considered from an artistic point of view, this should be done—a lesson required by not a few professed taxidermists. We understand the proceeds of the sale of this pamphlet will be added to the exhibition fund.

“REPORTS OF THE BOTANICAL RECORD CLUB.”—First Quinquennial Volume, 1873-77: Edited by F. A. Lees, F.L.S. London: West, Newman, and Co.—We have just received the above, which includes much very interesting matter, and will be a valuable addition to every botanist's book-shelf. It contains first the report of the Recorder for 1877, and then the new County Records, of which about 83 refer to Yorkshire, a fair proportion of them having been gathered by the various members of the Yorkshire Naturalists' Union during their several excursions; II. the general Locality List; III. extinctions and reappearances; IV. aliens, casuals, and escapes; and V. County Catalogues, Basis Lists, &c., a paper on the Distribution of *Chara* as shown by specimens in his herba-

rium, by Prof. C. C. Babington, M.A., F.R.S., F.L.S. Some corrections and addenda follow, and the whole is concluded by the Quinquennial Appendix, giving a summary of county distribution additional to "Topographical Botany." This work, which is much too comprehensive for us to give even a short summary of its details, we believe may be purchased by any botanist not a member of the Club from the publishers or recorder, and we strongly recommend it to the consideration of all our brethren of the fields. A few corrections and errors, sent to us by our valued correspondent Mr. J. S. Wesley, M.B., are appended.

BOTANICAL LOCALITY RECORD CLUB.—ERRATA.—The members of the Botanical Locality Record Club have received the Report of the Recorder for 1877. There are a few slight errata which may be advantageously pointed out in the *Naturalist* :—

- P. 199, l. 7, for "viols," read "vials."
 ,, 238, for "*R. tomentosa*" read "*Rosa tomentosa*," to distinguish genus *Rosa* after *Rubus*.
 ,, 239, l. 3, for "West Cowick," read "East Cowick."
 ,, 243, l. 40, for "Gordale Cove" read "Gordale Scar." There is Malham Cove about a mile off.
 ,, 258, l. 10, for "immediate," read "intermediate."
 ,, 272, under *Vicia gracilis*, for "Fraser," read "Flower."
 ,, 288, ,, *Rhinanthus Crista-galli* insert "53" between 48 and 79.
 It is given on p. 218, line 4 from the bottom.—J. S. WESLEY.

Rainfall for January.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 0·86	7	0·86	* 3·25	13	0·30
LEEDS ... (H. Crowther) ...	183	1·32	10	1·32	...	14	0·48
HALIFAX... (F. G. S. Rawson)	360	1·30	12	1·30	5·40	...	...
BARNSELY ... (T. Lister) ...	350	1·08	11	1·08	2·20	14	0·33
INGBIRCHWORTH (do.)	853	1·19	13	1·19	3·54	14	0·47
WENTWORTH CASTLE (do.)...	520	1·39	6	1·39	2·48	18	0·70
GOOLE ... (H. F. Parsons) †	25	...	...	...	...	...	...

* This is the average to date for 13 years, 1866-78.

† No returns.

N.B.—Most of the above returns are entered as principally snow.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—At the fortnightly meeting, Feb. 4th, Mr. A. Kell continued his interesting papers on British birds and their eggs, including the shrikes and tits, illustrated by eggs from his collection, and the birds from the collection of T. Lister. Few notes on birds were given for this month. The water-fowl had fled anywhere in search of unfrozen water. Many land birds had partially disappeared—even the winter visitants, as fieldfares and redwings. On the 6th Feb. chaffinches (both sexes), tits, and blackbirds disappeared from the houses when they had been well fed. Robins sang throughout the storm. Missel thrushes sang Jan. 20th, dunnocks Feb. 7th, skylarks 8th, thrushes, blue tits, 11th. Many pied blackbirds, several bullfinches, pied wagtails, and yellow-hammers were noted.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting January 7th, the president in the chair.—After the exhibition of specimens the president delivered his inaugural address. After soliciting the members to keep up their regular attendance, he reviewed the present state of our knowledge with regard to the distribution of organic forms of matter, treating especially of the present physical configuration of the globe with regard to distribution.

MEETING January 21st, Mr. Firth in the chair.—Mr. Carter read a paper on “The additions to the local list of Lepidoptera during 1878.” All the ascertained species of this district were exhibited in illustration of the paper, 219 in number. The paper showed an addition of 30 species to the list, the principal of which were :—*Selenia lunaria* (Hawksworth), *Venusia cambricaria* (Bingley), *Larentia salicata* (Shipley), *Eupithecia venosata* (Cottingley), *Ypsipetes impluviata* (Hawksworth), *Agrotis agathina* (Harden), *Tryphaena janthina* (Saltaire, Bingley, &c.), *Orthosia suspecta* (Bingley).

MEETING February 4th, the president in the chair.—Mr. Benney read a paper on “The Electrical Theory of the Weather,” which was followed by an animated discussion.

[CORRECTION.—On page 77 read *A. fumata* for *A. subsericeata*.]—W. WEST, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—The above society, which has existed many years under the name of “The Stainland Naturalists' Society,”—having held its meetings at Burwood—held its first (February) meeting at West Vale, under the above title. The chair was occupied by Mr. E. Garside, who exhibited a fine specimen of the red-throated diver, shot at Morecambe by Mr. J. Sunderland, Coley Hall. Mr. F. Lumb exhibited a male peregrine falcon. On the motion of Mr. W. H. Stott, the society formed itself into sections for the better working of the different branches of natural history.

HUDDERSFIELD SCIENTIFIC CLUB.—Ordinary meeting Feb. 21st, Mr. Joseph French, president, in the chair.—Mr. S. D. Bairstow exhibited four specimens of the Scotch form of *Chortobius Davus*; Mr. Geo. Brook, ter., *Achorutes similatus*, the new British Collembola recorded in the February number of the *Naturalist*; also *Papirius ornatus*, *P. fuscus*, *Smynthurus fuscus*, and *Isotoma viridis*, mounted as objects for the microscope; *Tomocerus plumbeus*, and *Lepidocertus curvicollis*, living. He also exhibited a new method of obtaining dark field illumination, devised by Prof. Lighton, and described in the Oct. number of the Amer. Quar. Jour. Micros. Mr. French gave his opening address, which chiefly dealt with the Baconian system of philosophy, and was listened to with much interest by the members.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Annual meeting, January 27th.—Mr. S. J. Capper was re-elected president; Mr. Benjamin Cooke, Southport, vice-president; and Mr. W. E. Sharp, secretary for the year. During the two years of its existence 19 papers had been read, six of which had been subsequently published. A paper was read, entitled "An Entomologist's Holiday," communicated by Mr. W. H. Tugwell, of Greenwich; Mr. B. Cooke exhibited a pair of *Thereva fuscipennis*, captured at Bowden in 1875, being then new to the British list; Mr. T. J. Moore sent for exhibition a poisonous larva, native of Honduras, sent to the museum by Surgeon-Major S. Archer.

OYENDEN NATURALISTS' SOCIETY.—Monthly meeting, Mr. T. Stott, v.p. in the chair.—Mr. J. Spencer exhibited a great number of microscopic slides in fossil botany. Some of the specimens were entirely new ones, amongst them being the following:—*Zygopteris cranetime* (sic), lepidostriolites full of spores, section of a fir cone, macrospore, transverse section of *Stigmaria* rootlets, and vertical section of the same; *Lepidodendron Harcourtii*, and asterophyllites. Mr. T. Hirst exhibited a beautiful specimen of the tawny owl.—JOSEPH OGDEN, Sec.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—319th meeting, January 21st, Mr. H. Pocklington, F.R.M.S., v.p., in the chair.—Mr. Tuffen West, F.L.S., the celebrated microscopic artist, exhibited a large series of his own original drawings, principally of *Acari*—materials for his forthcoming monograph of that group. Many interesting forms were figured; in particular, one drawn from a specimen found by the Rev. John Hanson, of Leeds, will constitute, together with another species collected by Mr. West, a new genus, which will form a connecting link between the *Tardigrada* and *Acari* proper. Mr. West addressed the meeting, and afterwards practically demonstrated his method of drawing from the microscope. Various apparatus for microscopic drawing were then shown by Messrs. Abbott & Teasdale.

320TH MEETING, February 4th, Mr. W. Howgate, v.p., in the chair.—A long list of donations to the library was announced. Practice was made by members of the Microscopical Section in drawing from the microscope,

and a good number of drawings were shown, those of Mr. W. Barwell Turner's being remarkably well executed. Mr. C. H. Bothamley showed a calorimeter, and a mass of agglomerate from a blast furnace.

321ST MEETING, Feb. 11th, Mr. B. Saynor in the chair.—Mr. W. Barwell Turner read a short paper upon the researches of Pasteur, which gave rise to an interesting discussion. Large numbers of insects were shown by Messrs. Tyer, Grassham, Roebuck, and Smethurst, and of microscopical specimens by Messrs. Edwards, Saynor, Emsley, and Turner. An extract from a letter from Mr. Robert Lee, of Thirsk, was read, announcing the capture of a fine Sclavonian grebe, which was shot on the river Swale at the end of January; and also that a very fine adult male golden-eye duck was shot on the 3rd February, being rare in the Thirsk district.—WM. DENISON ROEBUCK.

SELBY NATURALISTS' SOCIETY.—Annual meeting Feb. 1st, the president in the chair. In the report read by the secretary it was stated that the number of members had been increased from 48 to 67. The excursions during the year were—on May 26th, with the Goole Scientific Society to Roche Abbey; on June 26th, to Byram Park; on August 7th, to Riccall Common; on August 21 to Escrick Park; and on Sept. 11th, to Osgodby Woods. At a council meeting held on April 18th, it was suggested by Dr. Parsons that recorders should be appointed to note the fauna and flora of the district. This suggestion was acted upon, and has borne good results. The financial position of the society is satisfactory. Mr. J. T. Atkinson, F.G.S., was elected president, and Mr. Wm. Cheesman secretary.—On Wednesday, Feb. 5th, Mr. Henry Crowther, of the Leeds Museum, delivered a lecture on "The Invertebrate Animals." After first noticing their position in the animal kingdom,—the broad, easily discernable distinctions that separate dead and living matter, animal and plant life, and vertebrate and invertebrate animals,—the lecturer proceeded to describe typical examples from the different classes, orders, &c., which together constitute the great division under consideration: these (which were illustrated both by diagrams and specimens) were treated in their scientific order, the better studied forms being dwelt upon at greater length. In the short time at the disposal of the lecturer upon a subject of such magnitude, a pleasant and entertaining sketch was evolved in the description of forms of animal life, from the simple *Gregarina*, a parasitical protoplasmic particle common in the intestine of the cockroach, &c., to the cuttlefishes of our seas. Of all the incidents detailed, those which showed the development of protoplasm, and its adaptability to the varied wants of many of the lowly forms of animal life, and the marvellous evolution of free swimming jelly-fishes, from gonophores or generative buds in zoophytes were most striking and interesting.—W. N. CHEESMAN, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Mr. J. Harrison in the chair.—The chairman exhibited a magnificent

collection of bird skins, recently imported from Germany. Amongst them were a large number of birds of prey, some of them very rare, including :—The golden eagle (*Falco naevius*), the Gyr falcon (*F. islandicus*), the honey buzzard (*F. apivorus*), Montagu's harrier (*F. cineracens*), the snowy owl (*Strix nyctea*), the eagle owl (*S. bubo*), the Lapland owl (*S. laponica*), the red-crested whistling duck (*Anas rufina*), Steller's western duck (*A. dispar*), the great northern diver (*Colymbus glacialis*), the dotterell (*Charadrius morinellus*), the bittern (*Ardea stellaris*), the waxwing (*Bombycivora garrula*), &c. Mr. T. L. Smith : a beautiful specimen of the common blackbird, spotted all over with white. The specimen was a male bird in fine plumage, and was caught by him in Burton Lane, where it has been noticed for three or four years. Mr. G. Bacon ; the spotted crane (*Gallinula porzana*), shot on the banks of the Ouse near Nunthorpe. Mr. J. Ripley : the hen harrier, shot near York Nov. 22nd ; the stormy petrel (*Thalassidroma pelagica*), captured on Langton Wold in a very exhausted state, sent by Mr. Edson Nov. 22nd : the sea auk (*Uria grylle*), captured on Strensall Common, and which lived for several days ; and two specimens of the hawfinch (*Fringilla coccythraustes*), shot near York. Mr. C. Helstrip ; a female specimen of the blackbird, spotted with white principally about the head, shot near Howden. Mr. G. Jackson : a box of insects, in which were four varieties of *grossulariata* ; these specimens, instead of being white spotted with black, were nearly all black, and were bred by Mr. Porteus, of Halifax ; also *Dianthecia irregularis* and *albimacula*, *Meliana flammea*, *Nonagria brevilinea*, (captured at Horning Fen), *Heliothis peltigera*, *Notodonta carmelita*, *Agrotis agathina* (bred), *Acidalia contiguaria* ; some fine varieties of *Arctia lubricipeda*, *Cleora glabraria*, *Hadena atriplicis*, and *Erastria venustula*. The secretary, Mr. Wm. Prest ; a series of eighty specimens, in very great variety, of *Cidaria immanata*, most of them taken by himself at Bishop's Wood, Sandburn, and Sherwood Forest : and some fine varieties from Scoonieburn, near Perth ; also a hybrid specimen of *Smerinthus ocellatus* and *populi*.

YORKSHIRE NATURALISTS' UNION.—EXHIBITION.—In connection with the annual meeting of the Union, held in Leeds in January, 1879, was organised and kept open for a week a very extensive and valuable exhibition of natural history specimens and scientific apparatus. A series of special articles on the various departments having been arranged for, to be published from time to time in the *Naturalist*, it is unnecessary for us here to enter into details. The credit of first suggesting that there should be an exhibition, as well as efficiently supporting it in every stage, is due to the Barnsley Naturalists' Society, and Mr. A. R. Kell, C.E., of that town, on whose proposition it was that the Union resolved upon the venture. The labour of getting up the affair—no slight task—of course devolved upon the members resident in the town where it was to be held. The result, however, of that labour was an exhibition the like of which for extent, value, and interest has never been equalled in

the county. The directors of the Leeds Mechanics' Institution showed their sympathy with the undertaking by granting the use of an extensive series of rooms at a merely nominal charge. The principal room was the large Albert Hall, which, suitably decorated, and containing an extensive series of aquaria and tables for microscopes, was mostly reserved for promenade, and formed an attractive rendezvous for all visitors to the exhibition. On one side of this central hall were the picture galleries, devoted to a magnificent show of birds on the walls, and insects on the tables. At the other side of the great hall were rooms on the same floor devoted to physical science and conchology, while above these were those set apart for geology and botany. Each of these rooms forms the subject of a special article. It may, however, be here pointed out that the walls of the conchological room were devoted to the exhibition of a splendid series of original drawings of acari, and of other microscopical objects, lent by Mr. Tuffen West, F.L.S., the eminent natural history draughtsman, a native of Leeds. A *conversazione* was organized for the first night, special attractions being provided, including the phonograph by the London Stereoscopic Company, the harmonograph, Mr. J. Wood's patent atmospheric stereoscope, numerous demonstrations, and a large microscopic display. The band of the Leeds Rifles performed selections of music, and at the commencement the exhibition was formally opened by the president of the Union, Mr. H. C. Sorby, F.R.S., and speeches delivered by Mr. Edwd. Atkinson, F.L.S., F.Z.S., president of the Leeds Naturalists' Club, Mr. John Barran, M.P., and Prof. A. H. Green, M.A., F.G.S., of the Yorkshire College. The next day (Saturday, the 11th of January) was the members' day, being the date of the annual meetings and the president's address. A series of demonstrations and short lectures, and selections on the pianoforte, were delivered every evening during the ensuing week. Mr. John Holmes gave a course of lectures on "Prehistoric Implements, from Flint to Bronze," on "Early Metals and their uses," and "Pottery from Prehistoric times to Wedgwood." Nearly every evening a party of visitors was conducted by Mr. C. H. Bothamley round the physical science department. Addresses in the geological room were given by Messrs. B. Howgate, F.G.S., and Thos. W. Bell. Lectures on "Ferns" and on "Mosses" were given by Mr. Thos. Hick, B.A., B.Sc.; "Hints on Collecting" by Dr. Parsons, of Goole; on "The Micro-Spectroscope" by Mr. Henry Pocklington, F.R.M.S.; on "Gems and their Colours" and on "Vibrations and Musical Pitch," by Mr. S. Jefferson, F.C.S.; on "The Flora of West Yorkshire" by Mr. Wm. West; and on "The Transformations of Lepidoptera" by Mr. W. H. Taylor. Pneumatical experiments were conducted by Mr. Crebbin, demonstrations with the telephone and microphone by Mr. T. Cuttriss, while microscopes were constantly on view. The exhibition finally closed on Friday, the 17th January, and it is satisfactory to add that not a single breakage can be attributed to the committee or their officials.

Report on the Conchological Department.—The conchological portion of the exhibition was, owing to the limited space at the disposal of the section, not so comprehensive as could have been desired; as far as it went it was, however, everything that could be wished. The exhibitors were four in number, viz: W. Nelson of Leeds, Robert Scharff of Bordeaux, J. W. Taylor of Leeds, and J. Wilcock of Wakefield. The largest exhibitor was Mr. Nelson, who, in addition to his fine collection of *Limnæadæ* (of which group he has made a brilliant speciality) showed several drawers of *Clausilie*, *Pupæ*, *Helices*, &c., which contained shells of great interest to students of Yorkshire conchology, as *Pupa sempronii*, *P. secale*, var. *edentula*, &c. The *Limnæadæ*, which filled five large show cases, are a family interesting for the subtle variation of their forms, and their wide dispersal over the globe. The collection embraced specimens of some of the rarest species, and several that are as yet undescribed. The common *Limnæa peregra* was represented by a large number of tablets which clearly showed that this species, under different names, is found throughout the world, the latest locality added being Tasmania, where it was found and described as new, under the name of *Limnæa hobartensis*, by the Rev. Tenison Woods. Many of the variations of this species described and named as distinct by foreign and British authors, were also represented. The special feature of this magnificent collection is its wealth of examples showing the variations of the group, not only in our own country but throughout the globe. Mr. Scharff's exhibit is a small but beautiful collection of 38 species and varieties of the land and fresh-water shells of the department of the Gironde, France—all collected by himself in the environs of Bordeaux. The collection has many points of interest, one of the most striking being the variations of our English species, as *Unio Requienii*, &c., the series of variations in *Cyclostoma elegans* and *Helix virgata* are specially noteworthy. Mr. Taylor exhibited a portion of his collection of *Helices*, formed mainly with the view of elucidating the affinities of the many forms that have been so prodigally described as new by foreign conchologists, and to illustrate variation as influenced by geographical distribution and physical surroundings. The series of the various reputed species of *Xerophila* and *Tachea* were of considerable interest. In the latter subgenus was a number of tablets of *H. hortensis*, var. *hybrida*—a shell upon the identity of which a considerable amount of error and misconception exists amongst Yorkshire conchologists. Mr. Wilcock, who is so well and favourably known as a diligent and successful conchologist, exhibited his collection of the land and fresh-water shells of Yorkshire, many of the species having been found by himself in the neighbourhood of Wakefield. He also exhibited a collection of models of their animals, made and coloured from nature by himself, to which subject he has given considerable attention. The collection is well known to most Yorkshire conchologists, and embraces several shells of considerable interest.

Diary.—Meetings of Societies.

- Mar. 4. Bradford Naturalists; "Field Geology"—A. Crebbin. Leeds Naturalists. Liversedge Naturalists. Bishop Auckland Naturalists.
- " 6. Selby Naturalists: Lecture, J. E. Clarke, B.A., B.Sc. Bradford Scientific: "The Anatomy of Insects," J. S. Stubbins, F.G.S.
- " 10. Manchester Cryptogamic.
- " 11. Leeds Naturalists. Huddersfield Literary and Scientific: "The Plants that grew when Coal was being formed," W. Cash, F.G.S.
- " 12. York and District Field Naturalists.
- " 13. Bradford Scientific: "How to examine a Plant microscopically." H. Pecklington, F.R.M.S.
- " 14. Goole Scientific: Report on Cryptogamic Botany, H. F. Parsons, F.G.S. Huddersfield Scientific Club.
- " 18. Leeds Naturalists. Bradford Naturalists: "Our Coasts," H. Hebblethwaite.
- " 20. Selby Naturalists: Lecture, G. Dent. North Staffordshire Field Club (annual) at Stoke.
- " 25. Leeds Naturalists. Huddersfield Literary and Scientific: "Salt," with experiments—G. Jaimain, F.C.S.
- " 27. Bradford Scientific: "The Fossil Plants of the Halifax Coal Measures," W. Cash, F.G.S.
- " 28. Goole Scientific: Report on Vertebratae—T. Bunker.
- " 31. Lancashire and Cheshire Entomological.

WANTED, Part I. of Dr. Braithwaite's Papers, on "RECENT ADDITIONS TO OUR MOSS FLORA," reprinted from the *Journal of Botany*.

J. S. WESLEY, Wetherby, Yorkshire.

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Original Articles.

A FORTNIGHT IN THE FENS.

BY G. T. PORRITT, F.L.S.

(Concluded.)

It is needless to particularise each day's doings separately, as we spent them very much alike. From the second morning, however, we generally beat over the thatched sheds and stables in the daytime on our way to the fen, and in this way secured several species we might otherwise have missed. Perhaps the best species taken was the very local *Aglossa cuprealis*. I think we were as much pleased with this moth as with any we took on our excursion, as it was totally unexpected, and indeed I did not know any locality where it was taken. The first two were found by Mr. Daltry in spiders' webs, on July 24th, and were of course dead; fine living ones were found afterwards, but never more than one or two in a day, though these were in different spots miles apart. One of them very obligingly deposited a few eggs, which hatched in due course, and I hope I have the larvæ now feeding. No doubt the species would be found generally distributed in Cambridgeshire if well looked for.

As was natural amongst so much moss-covered thatch, the *Scopariæ* were in great force, though this was more in numbers than variety. The best was *lineolalis*, but it was not common; *cembrae* also occurred occasionally, but *mercurialis* was in profusion; on the sides of two sheds in particular this species might have been taken almost every day in scores. They varied very much in size and colour, some being small and dull, others, females particularly, being large, dark, and every marking clearly and distinctly defined.

On the fen in the daytime, in addition to the species mentioned previously, we were very pleased to find the larvæ of *Papilio Machaon* in tolerable plenty. We were evidently rather too late to see the imago on the wing, though it must have been out a considerable time, as the larvæ were of every stage of growth. The very small ones were insignificant-looking things, being dingy black, with pale patch on the back, but the larger ones were gorgeous creatures. They were generally easily found, their intensely bright green and black, with red spots, shewing most conspicuously, especially as they were usually on the upper side of the higher leaves of the wild carrot. Even when not seen directly, their habit of feeding at once betrayed their presence, as they strip off every vestige of leaf down one side of the plant, leaving the bare midribs, whilst the leaves on the other

side of the plant are often perfectly entire. Though most were on the carrot, some were found eating with evident relish the common *Angelica sylvestris*.

Another very pretty larva, though belonging to a totally different order, was that of *Cidaria sagittata*; these we found on the seeds of *Thalictrum flavum*, but, unlike *Machaon*, they required very close searching for. Other larvæ taken during our stay included fine *Smerinthus ocellatus* on shoots of willow; the green and brown forms of the beautiful and singular *Chærocampa Elpenor*; a *Cossus ligniperda* crawling on the inn floor, perhaps strayed from the trunk of one of the fruit-trees in the garden; *Saturnia carpini*; *Pterophorus microdactylus* in the stems of *Eupatorium*; and others.

Passing from larvæ to the species taken in the imago state, the list is much longer, as might be expected. Of the rarer species we were very pleased to take five fine *Orgyia cænosa*; three on the night of the 26th July, and two more two or three days later. This moth, though formerly abundant in the fens, is now exceedingly rare, occurring in Britain only at Wicken, and there very sparingly. Last year only two specimens were taken, we were told, and this season only eight, five of which fell to my share, making the largest number to one net for several years. We were very desirous of getting *Macrogaster arundinis* also, but were unsuccessful, though two were taken one night by a local collector at his lamp, at no great distance from ours; this of late years has been considered purely a Wicken moth, until this season, when two were taken at Ranworth by Mr. Fletcher. Another peculiarly Wicken species, and until Mr. Wheeler's lamp turned it up a few years ago, hardly known in Britain, is *Nascia cibialis*. June is the proper month for the species, but on the night of the 26th July (the *cænosa* night), as we were coming off the fen, one of the local collectors showed us a specimen he had taken at his lamp, remarking at the time that he had never known it to occur so late. Judge of our surprise, then, next morning, when Mr. Daltry turned out his boxes, to find that he also had unknowingly taken a specimen, and a fair one too. These were the only two secured during our stay, though we worked hard afterwards to get another. Another rare species we took rather commonly was *Tortrix dumetana*. It flew just at dusk, and was then easily netted; later it came to the sugared flowers, and also to the lamps.

And now for the common species, and we will run through them more rapidly, as to particularise each at length would take up too much time, and is moreover unnecessary. *Gonepteryx rhamni* and

Vanessa Io flew about the lanes ; *V. cardui* on the edge of the fen ; *Satyrus Janira* and *Tithonus* of course everywhere ; *Chortobius Pamphilus* on the fen ; *Hesperia linea*, and I think also *Sylvanus* ; a dead specimen each of *Zeuzera æsculi* and *Cossus ligniperda* ; *Chelonia caja* and *Odonestes potatoria* were perfect plagues ; both species were most abundant, and came up to the lamps in numbers, banging against the glass, and then stunned by the blow, fell to the ground and went "fizzing" and spinning about, a number creating quite a concert. Others would persist in getting into the nets, or would crawl about our heads and shoulders, whilst frequently a precocious individual—generally a *potatoria*—would actually crawl through the opening at the top of the lamp and get inside, sometimes putting out the light. A variety of the male, of the same colour as the female, was not uncommon. The second brood of *Arctia fuliginosa* (and very large specimens they were) also came to the lamps. We were previously under the impression that this species was solely a day flier. *Liparis auriflua* and *L. salicis*, with *Bombyx neustria* and *B. quercus* were common of course. *Uropteryx sambucata* occurred in the lane ; whilst the geometers which came to the lights on the fen included the July brood of *Selenia illunaria*, *Crocallis elinguaris*, *Ennomos tiliaria*, *Acidalia scutulata* (in abundance), *A. bisetata*, *A. emarginata*, some very pretty banded forms of *Cabera exanthemaria* ; large golden specimens of *Strenia clathrata* were very common ; *Abraxas grossulariata* swarmed everywhere, occurring on the fen, and in all the lanes and gardens ; *Larentia pectinitaria*, *Eupithecia succenturiata* and *absynthiata* ; *Coremia unidentaria* in profusion ; *Phibalapteryx lignata* in fine condition, and common ; *Oidaria testata* and *fulvata*, &c. Belonging to other orders two fine *Ptilodontis palpina* came, and when settled looked for all the world like bits of rotten wood ; *Noto-donta ziczac* (second brood) came to other collectors' lamps, though not to ours ; *Miana arcuosa* was very common ; *Herminia tarsipennis* and *cribralis* ; *Pyrausta purpuralis* ; the four "China-marks," *Cataclysta lemnalis*, *Paraponyx stratiotalis*, *Hydrocampa nymphæalis* and *stagnalis* were all common ; *Crambus pascuellus*, *C. perllellus*, and *C. selasellus* ; *Rhodophæa marmorella* and *R. suavella* ; and a number of others. "Sugar" on the fen produced *Nonagria Helmanni* ; *Leucania phragmitidis*, with *lithargyria*, *impura*, and *pallens* ; *Miana furuncula*, including a very small form which puzzled us considerably for some days ; *M. literosa* ; *Caradrina alsines* ; *Agrotis nigricans* and *A. ravida* ; *Tryphæna interjecta* commonly (also flying about in the fens, and in the lanes in the daytime), with *T. fimbria*, *orbona*, and *pronuba* ;

very fine *Noctua rubi* and *umbrosa*; *Gonoptera libatrix*; *Mania typica*, &c. Species taken away from the fen included, besides many of the fen moths, *Acidalia incanaria*, *Cilix spinula*, *Herminia proboscidalis*, *Botys verticalis* (in swarms), *B. fuscalis*, *Scopula lutealis*, *Crambus pinetellus*, *Melia sociella*, and the pretty *Pterophorus pentadactylus* in profusion. One day, calling at Bailey's (a local collector) house, he showed us an old beehive from which he was breeding plenty of the interesting *Galleria cerella*, along with the more generally common *Meliphora alveariella*.

I did not take much interest in the micro-lepidoptera, but Mr. Daltry worked hard amongst them, and took (chiefly on the fen, though some were beaten out of thatch, &c.) a good many species. Of Tortrices, besides *Tortrix dumetana* already alluded to, *T. heperana* and *T. costana*; *Peronea Shepherdana* was common, after Mr. Warren of Cambridge had shown us the right way of looking for it: this was to go on one's knees and carefully search on the ground close to the roots of the various fen plants. Half-a-dozen specimens would thus sometimes be found at a single bunch of *Eupatorium*. *Bactra uliginosana*, *P. variegana*, *Dictyoptyx Holmiana*, *Sciophila perterana*, *Grapholita nigromaculana*, *Hypermercia angustana*, *Batodes angustiorana*, *Ephipphora ephipana*, *Senasia Wæberana*, *Dicrorampha politana*, *D. sequana* and *D. petivorana*, *Catoptria scopoliana*, *Angyrolepia dubisana* (?), *Sericoris fuligana*. Of Teineina, *Orthotælia sparganella* came to the lights, but only *Depressariæ* were taken much account of. Of them, no less than nine species occurred, viz., *liturella*, *arenella*, *subpupinquella*, *conterminella*, *angelicella*, *carduella*, *yeatiella*, *applanella*, and *pastuciarella*. This I think will finish our list.

The reader will already have formed a fair idea of what Wicken itself is like. It is a rural village of the first type; its low, white, thatched cottages, overgrown with vines and other creeping plants, with neat little flower gardens and bigger kitchen gardens attached, have a charming effect, and the liking for the place grew on us day by day. The church is at one end of the village, and would certainly be the better for "restoration," though I do not approve of the restoration of old churches generally. Though very interesting, it is one of the most "tumble-down" places we have seen for a long time, and is propped on two sides. It would make a good hunting-ground for the botanist, being overgrown with lichens, mosses, grasses, and various plants. Probably the "old complaint" operates here, as in many other parishes. The vicar is an exceedingly nice person, and evidently greatly respected by his parishioners. He called on us on

the Sunday afternoon, to ask Mr. Daltry to take the evening service ; however, as we had previously arranged to go to Soham Church, at the market town two miles away, he was unable to do so.

We left Wicken on Saturday morning, August 3rd, and had a pleasant drive to Ely, where in a corner at the railway station I boxed our last moth—a nice specimen of *Aglossa cuprealis* ! We had a nice run to Peterborough, where, having some time to wait, we examined the old Cathedral, the grand ancient Norman arches of which are something to be remembered. And thus ended our excursion.

Highroyd House, Huddersfield,
October 11th, 1878.

NOTE ON THE NEW BRITISH MOSS *AULACOMNION*
TURGIDUM.

BY E. M. HOLMES, F.L.S.

THE history of the discovery of this moss is as follows :—Mr. West, a Bradford botanist, during a botanical excursion with Mr. F. Arnold Lees in the North Riding of Yorkshire, gathered some moss which was supposed at the time to be *Aulacomnion palustre*, a species which is of common occurrence in Britain. On returning home, however, and re-examining it, Mr. Lees thought that it seemed to differ from that plant, and forwarded specimens to Mr. Boswell of Oxford, and the Rev. J. Fergusson of Brechin. By the latter gentleman it was identified as *Aulacomnion turgidum*—a verdict in which Mr. Boswell ultimately agreed. Mr. Fergusson's attention being thus called to the plant, he found among some mosses collected by Prof. Barker in 1871, some specimens of the same plant gathered on the Breadalbane mountains.

Aulacomnion palustre being a very variable plant—in the south of Europe sometimes attaining a length of a foot or more, while in Greenland and Labrador it becomes less than one inch, in fact as small as *A. androgynum*, and sometimes assuming the habit of *A. turgidum*—I may perhaps be pardoned for pointing out what seem to me to be the differences between the two species. *A. turgidum* has leaves which are imbricated and erect, both in the wet and dry state ; they are obtuse and concave, only about half the length of those of *A. palustre*, and their broadest diameter is usually above the middle of the leaf. The cells of the leaf are also more sharply and regularly

angular than in that species. From the varieties of *A. palustre* which resemble it in habit, *A. turgidum* may be known by the leaves being convex and not depressed at the base near the nerve. In *Aulacomnion palustre* the leaves are much longer and more tapering, the broadest diameter being usually rather below the middle of the leaf. The leaves are spreading when moist, but when dry each leaf becomes spirally twisted, and the back of the leaf near the nerve is seen to be depressed or concave.

The occurrence of this species in Yorkshire is of some little interest, because the plant has hitherto been considered to be almost exclusively a northern species, occurring in Greenland, Norway, Sweden, and Lapland, usually in company with other northern species such as *Paludella squarrosa* and *Hypnum nitens*. It has however been recorded from the Styrian Alps at an elevation of 2100 feet, but in a sterile condition.

In the "Bryologia Europæa," Prof. Schimper describes the leaves of *Aulacomnion turgidum* as perfectly smooth. I find, however, both in specimens collected by him, and in those gathered in Britain, that this remark can apply only to the upper leaves, the lower being more or less papillose, although to a much less extent than in *A. palustre*.

PHŒNOLOGICAL OBSERVATIONS ON MOSSES.

BY GEO. BROOK, TER., F.L.S.

A RECENT number of the "Revue Bryologique" contains a paper by Mr. H. W. Arnell on the above subject. The plan adopted is similar to that already in use in this country for other branches of natural history. Thirty-three species of widely distributed mosses are chosen for observation, and records are required on two points: first, as to when the moss blooms, and second, as to when the fruit ripens. Mr. Arnell considers a moss in bloom when in at least two "flowers" one or two archegonia are opened, while the others are still closed and uncoloured. If archegonia are not accessible, the antheridia may be observed, but care should be taken to see that the antherozoids have really swarmed, and not to be satisfied with an appearance of full development when the antheridium may not open for months afterwards.

Mr. Arnell's plan of observing approximately the date of blooming is to collect specimens weekly or fortnightly about the supposed time of fertilisation, and then at leisure to determine the time. Mr. Arnell

considers a moss to have ripe fruit when five to ten lids are detached from a specimen *in situ*. The lids are detached from *dried* specimens often before ripe. The following is a list of the species to be observed, and the various dates, so far as Mr. Arnell has observed them, for Hernöesand, Sweden :—

	Blooms.	Ripe fruit.
	(about)	(about)
Eurhynchium strigosum, Hoffm. ...	25, v.	20, v.
Pylaisia polyantha, Schreb. ...	10, vi.	10, v.
Hypnum cupressiforme, L. ...	10, vi.	10, v.
Tetraphis pellucida, L. ...	10, vi.	15, vii.
Aulacomnium palustre, L. ...	20, vi.	25, vii.
Dicranella varia, Hedw. ...	20, vi.	10, v.
Mnium punctatum, L. ...	20, vi.	1, vi.
Atrichum undulatum, L. ...	1, vii.	1, v.
Barbula unguiculata, Dill. ...	1, vii.	1, v.
Webera cruda, Schreb. ...	1, vii.	15, vii.
Polytrichum piliferum, Schreb. ...	1, vii.	15, vii.
P. commune, L. ...	1, vii.	1, viii.
Mnium cuspidatum, Hedw. ...	1, vii.	20, vi.
Grimmia apocarpa, L. ...	1, vii.	20, v.
Hedwigia ciliata, Dicks. ...	1, vii.	10, v.
Ceratodon purpureus, L. ...	1, vii.	1, vii.
Hypnum Schreberi, Willd. ...	1, vii.	10, v.
Hylocomium triquetrum, L. ...	1, vii.	10, v.
H. splendens, Hedw. ...	15, vii.	10, vi.
Bartramia pomiformis, L. ...	15, vii.	1, vii.
Barbula ruralis, L. ...	15, vii.	7, vii.
Pottia truncata, L. ...	15, vii.	1, v.
Dicranum undulatum, Willd. ...	15, vii.	15, x.
D. fuscescens, Turn. ...	15, vii.	15, x.
Philonotis fontana, L. ...	1, viii.	15, vii.
Brachythecium salebrosum, Hoffm. ...	5, viii.	10, v.
Hypnum incurvatum, Schrad. ...	5, viii.	1, viii.
H. Crista-castrensis, L. ...	5, viii.	1, v.
H. cordifolium, Hedw. ...	5, viii.	7, vii.
H. cuspidatum, L. ...	5, viii.	7, vii.
Funaria hygrometrica, L. ...	1, ix.	1, viii.
Plagiothecium denticulatum, L. ...	1, ix.	1, ix.
Dicranella cerviculata, Hedw. ...	1, ix.	1, v.

The time occupied in maturing the fruit varies very much in different mosses. Mr. Arnell says that in Sweden, *Dicranella cerviculata*, *D. heteromalla*, *D. subulata*, and *D. curvata* blossom about the first of September, and ripen their fruit sixteen to nineteen months afterwards, whereas *D. varia* and the remaining Swedish species of *Dicranella*

blossom about midsummer, and ripen their fruit six to eight months afterwards. *Hypnum Crista-castrensis* requires sixteen to twenty-one months to ripen its fruit, *Polytrichum commune* thirteen months, and so forth. This will explain the meaning of the figures in the second column. All the mosses given in the list are British species, except *Dicranum undulatum*, but many are rare or seldom found in fruit in this country, and so I would suggest for our own observations that the following common species be added to the list :—*Sphagnum cymbifolium*, Ehrh.; *Weissia viridula*, Brid.; *Dicranella heteromalla*, Hedw.; *Didymodon rubellus*, B. & S.; *Barbula muralis*, L.; *Grimmia pulvinata*, Dill.; *Bryum caespitium*, L.; *B. argenteum*, L.; *Mnium hornum*, L.; *Pogonatum aloides*, L.; *Fissidens bryoides*, Hedw.; *Brachythecium populum*, Hedw.

THE AUTUMN FLORA OF WHERNSIDE :

AN ACCOUNT OF AN EXCURSION IN SEARCH OF MOSSES.

BY F. A. LEES, F.L.S., AND W. WEST.

WE left Dent Station one morning last August during a heavy shower of rain, and took our way towards the marble works, collecting the following as we went :—*Blindia acuta*, *Ditrichum flexicaule*, *Orthotrichum cupulatum*, *Ulota Bruchii*, *Targionia hypophylla*, *Galium Mollugo*, and *Rosa tomentosa*, var. *scabriuscula*. From the marble works we crossed the wet meadow upland to Great Blake Gill, both sides of which we hastily worked. (We believe this little gill would well repay a thorough working.) We found here *Gymnostomum rupestre*, *Zieria julacea*, *Plagiothecium pulchellum*, *Bryum pseudo-triquetrum*, *Breutelia arcuata*, &c.

We now ascended the north-eastern shoulder to the spring, where the water rushes out of the hillside with great force at an altitude of 1800 feet, picking up in the ascent (as we trod on *Rubus Chamæmoris*) *Hylocomium loreum*, *Sphagnum intermedium*, *S. papillosum*, and *Aulacomnion turgidum*; specimens of this latter moss were determined by Mr. Boswell at the end of August, and we should have announced it ere this but for an arrangement we had made to work the same route in November, when we hoped to bring away a fair quantity of the moss for distribution, as unfortunately we only found a small quantity of it among the mosses we had collected that day, but unforeseen circumstances have postponed our intended journey. We have since learnt that it has been collected by Prof. Barker also on a north-east

slope in the Breadalbane mountains seven years ago, but was not determined until last October or November. Its occurrence in a similar cold aspect in Scotland seems to point out that it is a moss which may have been more abundant when our climate was colder. About the spring was plenty of *Selaginella selaginoides*, and close by we found *Poa alpina*. *Zieria julacea* we again found here, and other good mosses.

Along the morass and slope of Greensell Crags we found *Encalypta ciliata*, *Racomitrium lanuginosum*, *Polytrichum formosum*, *P. strictum*, &c.; we also noted *Asplenium viride* and *A. trichomanes*, var. *anceps*, and just before commencing the ascent of the steep east slope, we found *Sphagnum plumosum* and *S. cuspidatum*, then in the steep ascent *Racomitrium heterostichum*, var. *alopecurum*, *R. canescens*, *R. fasciculare*, *Andreaea petrophila* and *Orthotrichum rupestre*, and also *Lycopodium alpinum*, *L. Selago*, and *L. clavatum*, with a great abundance of viviparous *Festuca ovina*. The bare patches of soil about the summit-ridge to the cairn, are covered with tufts of *Oligotrichum hercynicum*, and on the well-top near the cairn we found *Grimmia Donniana*. In descending to Ribble-head by the crags we found small patches of *Encalypta ciliata* again, along with several of the mosses already mentioned,—in fact some of the mosses mentioned we found nearly all along our route. On the edge of the crags were *Sesleria coerulea*, *Alsine verna*, *Alchemilla vulgaris*, var. *montana*, and *Draba incana*, while in the swamp below *Hypnum stramineum* was growing about the roots of *Pedicularis palustris*. A little below here we had to wade the swollen stream, noticing all about an abundance of *Epilobium palustre* var. *ligulatum*. The following were among the mosses we found that day:—

<i>Sphagnum acutifolium</i>	<i>Funaria hygrometrica</i>	<i>Climacium dendroides</i>
<i>S. cymbifolium</i>	<i>Philonotis fontana</i>	<i>Homalothecium sericeum</i>
<i>S. contortum</i>	<i>Webera cruda</i>	<i>Campothecium lutescens</i>
<i>Andreaea petrophila</i>	<i>Bryum caespitium</i>	<i>Brachythecium rivulare</i>
<i>Dicranum scoparium</i>	<i>B. capillare</i>	<i>Eurynchium crassinervium</i>
var. <i>paludosum</i>	<i>B. pallens</i>	<i>Hypnum fluitans</i>
<i>Didymodon rubellus</i>	<i>Mnium rostratum</i>	<i>H. filicinum</i>
<i>Barbula muralis</i>	<i>M. punctatum</i>	<i>H. commutatum</i>
var. <i>rupestris</i>	<i>Aulacomnion palustre</i>	<i>H. cupressiforme</i>
<i>B. subulata</i>	<i>Polytrichum commune</i>	var. <i>filiforme</i>
<i>B. spadicea</i>	<i>P. juniperinum</i>	<i>H. resupinatum</i>
<i>B. tortuosa</i>	<i>P. piliferum</i>	<i>H. molluscum</i>
<i>B. ruralis</i>	<i>Fissidens taxifolius</i>	<i>H. cuspidatum</i>
<i>Grimmia pulvinata</i>	<i>Neckera crispa</i>	<i>H. Schreberi</i>
<i>G. apocarpa</i>	<i>N. complanata</i>	<i>Hylocomium splendens</i>
var. <i>rivulare</i>	<i>Thuidium tamariscinum</i>	<i>H. squarrosum</i>
<i>Splachnum sphaericum</i>		

We also collected *Scapania resupinata*, *Metzgeria furcata*, *Peltigera polydactyla*, and *Parmelia omphalodes*, as well as made notes of 103 other plants on the same route, 28 of which we observed at an altitude of above 2000 feet.

Short Notes and Queries.

Obituary—FREDERICK SMITH.—It is but fitting that a Yorkshire journal should notice the great loss which entomological science has sustained by the death of a man who has contributed more than any other to the working out of the hymenopterous fauna of the county. For the full record of the obligations under which he has laid the naturalists of this county, it will suffice to refer to the lists of Yorkshire hymenoptera in the Trans. of the Yorksh. Nat. Union for 1877 and 1878. Many seasons have been spent by him in the investigation of our hymenopterous fauna—some of them in company with Mr. Talbot of Wakefield; and many of his new species were described from Yorkshire specimens. Frederick Smith was born in London Dec. 30, 1805. Of early artistic inclinations, he began life as an engraver, and in after days his own and other papers profited by his ability to execute the plates. His tastes gradually inclining him more and more to science, he eventually, on the death of Edwd. Doubleday in 1850, received an appointment in the Zoological Department of the British Museum, an officer of which he remained to the day of his death. In the same year he became a member of the Entomological Society, of which for many years he was on the Council, usually as a vice-president, and in his turn he occupied for two years the presidential chair. In 1855 he published his monograph of British bees, followed in 1858 by one on the ants, wasps, and fossorial. About the same time he published a series of catalogues of the *Aculeate Hymenoptera* in the Museum, besides enriching by his pen all the entomological periodicals, and the Transactions of the Linnean, Zoological, and Entomological Societies. In 1876 he brought out a second edition of his "British Bees," and kept up his literary work to the last. He died suddenly in London, at the age of 73, on the 16th February last. Of high general culture, a ripe Shakespearian scholar, of literary ability, of kindly and amiable disposition, his companionship was highly appreciated by his friends, while his popularity in the Entomological Society is attested by the frequency with which he was a vice-president. His scientific reputation may safely be permitted to rest upon his published works, which include various important monographs. Montaigne says he "would have every one write what he knows, and as much as he knows, but no more," and this sentence is eminently characteristic of Frederick Smith. He was a specialist who knew his own subject well, and gave his fellow-men the benefit of his knowledge. He avoided two common errors: on the one hand he did not suffer his knowledge of his own speciality to perish with him: on the other he refrained from writing on subjects which he had imperfectly studied. His name will never perish, for it is associated with a long roll of species of which he was the describer, or which were dedicated to him by his friends. May we hope that among the small band of English hymenopterists there may rise up one who shall take the prominent place which was so long held—first by William Kirkby, and then by Frederick Smith.—W. D. R.

Rainfall for February.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·36	20	3·22	* 5·75	8	0·57
LEEDS ... (H. Crowther) ...	183	2·81	23	4·13	...	13	0·42
HALIFAX... (F. G. S. Rawson)	360	4·52	21	5·82	7·40	...	...
BARNSELY ... (T. Lister) ...	350	2·49	22	3·57	3·28	13	0·37
INGBIRCHWORTH (do.)	853	3·21	25	4·40	5·05	8	0·50
WENTWORTH CASTLE (do.)...	520	2·53	20	3·92	3·79	14	0·40
GOOLE ... (H. F. Parsons) †	25	2·73	21	3·79	1·93	15	0·50

* This is the average to date for 13 years, 1866-78.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting March 4th.—Observations of birds from this neighbourhood and other places were made. Not much was reported of insects and flowers, which are late in appearing. Feb. 6th, a sandpiper noted in the Dearne valley; 17th, yellow hammer, also the great tit; 21st, many corn buntings at Day House, among the stacks; a golden plover, among peewits, redwings, &c., found dead; 26th, flocks of starlings reappear; 27th, chaffinches in song; March 3rd, a gannet shot at Carlton, near Barnsley, not recorded in this neighbourhood before; 8th, grey wagtail seen at Cudworth, brood rarely noted this severe season—kingfishers, a few bullfinches noted at intervals; 12th, pied wagtails reappear near houses, these residents and others, as larks, buntings, and thrushes, partially disappearing during the intense frosts. J. E. Palmer, formerly of Huddersfield, writes from Dublin that the birds are dying by hundreds; he had dissected two thrushes, a starling, sparrow, &c., found dead, and their crops were empty except that the thrushes and starlings had remains of snail shells. Mr. Talbot writes (March 3rd) to record two Canadian geese, a hawfinch, and two female merlins. On one day, during a fall of snow, were noted eight common and thirteen yellow buntings, six chaffinches, five greenfinches, and two mountain finches. Of waterfowl in that part and at Cold Hiendley dam, which supplies the Barnsley and Wakefield canal, have been seen many wild ducks, including golden-eye, wigeon, pochard, and scaup duck. Mr. E. Hailstone, of Walton Hall, informed me on March 7th that on the breaking up of the frost early in March there were 400 waterfowl on the

lake. The birds which generally stay on the estate have required more than their usual supply of Indian corn, yet some Brent geese and wigeon perished.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Feb. 18th, Mr. Illingworth in the chair.—Mr. Firth gave the first part of a paper on "The Birds of the Bradford district," enumerating all the birds that have as yet been recorded for the district, 128 in number, with their comparative rarity or otherwise, as well as their geographical distribution.

MEETING March 4th, the president in the chair.—*H. rupicaprar*ia was shown from Shipley, and *Flustra foliacea* from Ireland. Mr. Crebbin gave a paper on "Field Geology," in which he described hill-shaded and contour maps, and said that the latter were the best. He also described the other kinds of geological maps. Using a clinometer, he showed how to ascertain the true dip of a bed, and how, after a little experience, an observer can say what such and such surface beds are by the appearance of the escarpments. He then described minutely the local geology of a section of the Aire valley from Idle Hill to Baildon Hill, with its outlying coal measures, including the sectional appearance of a large esker below Shipley.—WM. WEST, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting March 3rd, at West Vale, the president in the chair, who exhibited a grey gull, and eggs of the nightingale. Mr. B. Noble read a short sketch of the Life of Robert Dick, the Thurso Baker.—W. H. STOTT.

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 17th.—The reports of the recorders in conchology, botany, meteorology, and geology were submitted. The Rev. R. D. Maxwell's list of mollusca contained seventy species and seven varieties. The localities were arranged in four columns according to the several vice-counties coming within the Goole district. Mr. Birks, in his report on Botany, enumerated 61 species of flowering plants added to his previous list during the past year, among them being *Ranunculus fluitans*, *Arabis perfoliata*, *Trifolium filiforme*, *Astragalus glycyphyllos*, *Peucedanum palustre*, *Carduus pratensis*, *Limosella aquatica*, and *Scutellaria minor*. Dr. Parsons submitted a report on the meteorology of the past year, illustrated with tables; and also read a report on geology, in the first part of which he recapitulated the observations which had been made at the several excursions of the society during the past summer, and in the second part gave a summary of the information which he had been able to obtain from well borings and other sources. Recent well borings had shown that the line of junction between the keuper marls and bunter sandstone passed under Goole, beneath the covering of alluvial deposits; and from comparison with other sections it was shown that the dip of the strata was 92 feet per mile, to the east; this would give 700 feet as the thickness of the keuper, and 1270 feet that of the bunter.

MEETING, Jan. 31st.—Paper by Mr. J. Lockington, on “Some of the properties and peculiarities of water.”

MEETING, Feb. 14th.—Lecture by Mr. T. Rowney, of Hull, on “Sound, its relation to the telephone, microphone, and phonograph,” all of which instruments were exhibited.

MEETING, Feb. 28th.—A deputation was appointed to wait on Mr. Creyke, lord of the manor of Rawcliffe, with reference to the preservation from enclosure of such parts of the Rawcliffe rabbit hills as were the most interesting to students of natural history. A germinating cocoa-nut was exhibited, showing the enlarged pear-shaped fleshy cotyledon within the cavity of the albumen. A paper was read by Mr. H. T. Gardiner, on “Some points of local history.”

MEETING, Mar. 14th.—A collection of lichens was exhibited by Dr. Parsons, who described and pointed out the characters of that order of plants, and showed the way to examine them microscopically. He also submitted lists of the cryptogamia of the district, which at present included 140 mosses, 22 hepaticæ, 57 lichens, 179 fungi, and 80 algæ.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting March 14th, Mr. S. L. Mosley, vice-president, in the chair. The last report of the North Staffordshire Field Club was laid on the table. Mr. C. P. Hobkirk showed a peculiar bunting from the Falkland Isles, evidently closely allied to our ciril bunting. Mr. Geo. Brook, with the microscope, the following fungi, &c.:—*Palmoglaea macrococca*, *Sphaeria acuminata* and *thelena*, *Peronospora nivea*, *Geoglossum hirsutum* and *difforme*, *Peziza succosa*, and *Massaria suridia*; the chairman, *Larentia salicata*, taken at Meltham, *Anisopteryx aescularia* (Huddersfield), also a very variable-sized series of *Liparis dispar* (bred). Mr. G. T. Porritt showed living larvæ of two very distinct forms of *Stilbia anomala* from Torquay, and series of *Bactra uliginosana* and *Anesychia funerella* received by him from Lord Walsingham. He also showed part iii. of Owen Wilson’s “Larvæ of British Lepidoptera.” Mr. S. D. Bairstow read a paper on “Ichneumons,”* illustrated by beautifully-executed drawings by himself.

LEEDS NATURALISTS’ CLUB AND SCIENTIFIC ASSOCIATION.—322nd meeting, Feb. 18th.—The chairman, Mr. Benj. Holgate, F.G.S., v.p., showed specimens of the stems of a very large number of arborescent plants, both exogenous and endogenous, and gave an interesting address in explanation of the different arrangements of the fibro-vascular bundles, as observable in the sections. Mr. W. H. Hay exhibited some interesting varieties of the egg of the blackbird (one, a pale blue one, is to all appearance the same as *Turdus migratorius*, or American robin), house sparrow, and guillemot. Mr. Walter Raine, death’s head chrysalis (*Acherontia Atropos*) from a potato field near Tadcaster.

* We propose publishing this paper shortly.

323RD MEETING, Feb. 25th.—The inaugural address was delivered by the new president, Mr. Edward Atkinson, F.L.S, F.Z.S.

324TH MEETING, March 4th.—Mr. W. Barwell Turner (in the chair) exhibited the skin of a long-eared bat (*Plecotus auritus*), and a number of slides of the wings of various lepidoptera, some of them showing the plumules. Mr. John Grassham brought a number of lepidoptera, including *Argynnis adippe*, var. *cleodoxa*, Adel specimen of *Vanessa polychloros*, and Leeds and Doncaster examples of *Vanessa antiopa*. Mr. Walter Raine showed a number of birds' eggs, British and foreign, especially a pair of the Australian emu, which from their large size and dark green colour were very noticeable. With the microscope Mr. B. Saynor showed the spermatozoa of the common frog: Mr. Washington Teasdale, Schultz's artificial diatom-slides, also slides of cracked silica film from Mr. H. J. Slack, Pres. R.M.S., also a series of line and curve rulings (by himself) on glass, as dark-field test objects. Mr. Jas. Abbott gave a short description of the work done at the monads by Rev. W. H. Dallinger, F.R.M.S., and Mr. D.'s method of examination.

325TH MEETING, March 11th.—The chairman (Mr. B. Holgate, F.G.S., v.p.) showed a number of specimens of the sandstones found in the neighbourhood of Leeds, and gave a short address on their adaptability to building purposes. A discussion thereupon arose as to the causes of decay of public buildings in Leeds and elsewhere, in which several members joined. Insects were shown by several members, including *Cymatophora flavicornis*, taken on the 10th March in the Meanwood valley by Mr. Smethurst, who also showed a nice dark variety of *P. pilosaria*, taken recently at Shipley. The microscopists discussed an excursion they had made two days before to Roundhay Park, at which many objects were collected, including stentors, diatoms, hydræ, vorticellæ, &c. Mr. F. W. Edwards showed the circulation of chylaqueous fluid in the branchiæ of May-fly larvæ; Mr. E. Thompson, a small triplet lens for use as a diatom finder; Mr. W. Barwell Turner exhibited *Spirogyra*, diatoms (in the frond) and *Ascobolus*, all in glycerine jelly, from Roundhay; and Mr. F. Emsley *Cladophora glomerata* and *zygnema*, also from Roundhay.—W. D. R.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, 17th March, Mr. J. Whitehead, president, in the chair.—The Rev. J. Fergusson was unanimously elected an honorary member of the society. With reference to the proposed collection of British mosses for the Free Reference Library, the secretary, Mr. Thos. Rogers, read letters from Dr. Braithwaite, Mr. A. Stansfield (Todmorden), Mr. H. Boswell (Oxford), Mr. Davies (Brighton), Mr. J. Barnes (Milnthorpe), and Dr. Wesley (Wetherby), offering to contribute rare species, and stated that he had already received from the above-named and other gentlemen a considerable stock, but the arrangement of them would necessarily be a work of

time and labour. The president exhibited fresh-gathered specimens of *Dicranodontium longirostre*, *Eucladium verticillatum*, and *Campylostelium saxicola*—all new to the district; also the rare *Campylopus paradoxus*, gathered at Stayley Brushes. Another interesting moss exhibited (sent by Mr. Hobkirk) was a dried specimen of the *Dicranum* gathered last year at Wharnccliffe Crags by Dr. Parsons, which has been the subject of much speculation and doubt. It was at first thought to be the species *falcatum*, but this was considered by competent bryologists to be quite erroneous; and at length the Rev. J. Fergusson gave it the provisional name of *Dicranum saxicola*. The president exhibited fresh-gathered specimens of a closely allied moss from Stayley Brushes, and expressed his opinion that this latter, at all events, was a form of *D. fuscescens*; also fine fruiting specimens of the moss mostly known as *Hypnum elegans*, Hook., gathered by himself and Messrs. Ashton and Percival near Barmouth. He also pointed out that it disagreed in several important characters from Hooker's figure and description in "*Musci Exotici*," and expressed his opinion that the name given to it by Dr. Spruce in 1846 (*H. Borrerianum*) would most likely be reverted to. He also stated that he was supported in this opinion by Prof. Lindberg, Dr. Spruce, Dr. Braithwaite, and the Rev. J. Fergusson. A specimen of *Orthodontium gracile* from Tunbridge Wells, was exhibited, having been gathered there by Mr. Holmes. This moss has been generally supposed to be peculiar to Cheshire and Yorkshire, but it was stated that Mr. Borrer had gathered it at Tunbridge so long ago as 1844. Mr. R. R. Bastow read an interesting paper on the potato fungus *Peronospora infestans*, which was illustrated by specimens under the microscope, and lithographed sketches.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting March 5th.—Mr. E. B. Wigglesworth, V.P. (in the chair) exhibited a very fine specimen of *Goliathus magnus*, from South Africa, and several species of British coleoptera.

YORKSHIRE NATURALISTS' UNION EXHIBITION AT LEEDS.—*Report on the Entomological Section.*—This section made a good show, though, as is almost always the case, the exhibits in lepidoptera far exceeded those in all the other orders put together. It is greatly to be deplored that our entomologists so persistently ignore the less conspicuous—but none the less interesting—other branches of the science. Perhaps the most interesting exhibit was the grand collection of larvæ sent by Lord Walsingham, the specimens preserved and mounted by himself. It is impossible to speak too highly of this collection, so great an advance is this method of arranging the specimens in a cabinet over our old stiff manner of keeping simply a series of pinned imagoes. Here the space left for each species was about the same as in most cabinets, but only a single imago was placed at the top, and beneath it the food plant, on which was mounted, in the most natural positions, a number of larvæ of the species

in various stages of growth, showing at a glance the complete history of the species. The larvæ of *Papilio Machaon*, *Acronycta alni*, and others, were enough to make a lepidopterist wild with delight. Mr. W. Prest, of York, showed his fine collection of imagos, which is undoubtedly one of the best in the provinces. It was beautifully arranged, and contained, as did also that of Mr. G. T. Porritt, of Huddersfield, which was also exhibited, an unusually large number of rare species. Mr. Prest's included the following, not in the other collection :—*Geometra sinarag-daria*, *Eupithecia extensaria*, *Eubolia mæniata*, *Pachnobia alpina*, *Cram-bus adipellus*, and others ; whilst Mr. Porritt showed *Charocampa Nerii*, *Ennomos antennaria* (*alniaria*), *Nascia ciliatis*, *Scoparia lineolalis*, *Ephestia passulella*, &c., which were wanting in Mr. Prest's. Both collections contained some very fine varieties. Messrs. Chas. Smethurst and John Grassham's (Leeds) collections were very good, and included some very extraordinary varieties ; the former had three beautiful examples of the broad black-bordered form of *Abraxas grossulariata*, also some as good varieties of *Arctia menthastri*, *A. mendica*, and *A. caja*, as we have ever seen. Another exceedingly interesting collection was that exhibited by Messrs. J. W. Carter and J. Firth, of Bradford, showing the lepidopterous fauna of that district, and all taken within six miles of the town. We were rather surprised, but very pleased, to notice *Larentia salicata*, and several other species we should not have expected to come across in such a district, amongst them. The other exhibits included *Noctuæ* from Torquay, by Mr. Walter Buckton of Leeds ; two drawers of European butterflies by Messrs. W. Buckton and H. Lupton, of Leeds ; four drawers of British moths, with preserved larvæ, by Mr. Henry Cautley ; two drawers of preserved larvæ, with their imagos, by Mr. Alfred Denny of Leeds ; five cases of silk-producing bombyces, and European lepidoptera, by Mr. R. B. Jowett of Leeds ; lepidoptera taken at Rannoch by Mr. Henry Lupton ; a case of Grange lepidoptera, by Messrs. W. G. Smith and George Tyers, of Leeds ; British lepidoptera and cocoons of silk-producing moths, by Mr. William Porteus of Halifax ; and a case of splendid varieties of British lepidoptera by Mr. James Varley of Huddersfield. As representing the hymenoptera, Mr. S. D. Bairstow of Huddersfield showed an interesting case of British ichneu-monidæ, amongst the species being one which seems likely to prove entirely new to the British list. The Rev. G. C. B. Madden, B.A., of Huddersfield, sent an original copy (temp. 1780) of Moses Harris' "Aurelian," and a quaint old book it is, though the plates are infinitely superior to those of many of our modern works. Mr. S. L. Mosley, of Huddersfield showed a series of plates of exotic butterflies and varieties of British lepidoptera, painted from nature by himself, which were justly and universally admired for their wonderful execution. Lastly, Mr. C. Brady of Edmonton showed a specimen drawer of a very superior style of cabinet, combining many capital qualifications for a good cabinet.

Diary.—Meetings of Societies.

- April 1. Bishop Auckland Naturalists. Liversedge Naturalists. Bradford Naturalists; Paper, "Action of Water," W. Jagger. Leeds Naturalists.
- " 2. Wakefield Naturalists.
- " 3. Selby Naturalists: Paper, "Microscopic Plants and Animals," W. N. Cheesman. Bradford Scientific: Paper by E. Mirfield.
- " 8. Leeds Naturalists. Huddersfield Literary and Scientific: Paper, "The simplest forms of Organic Life." Joseph French.
- " 9. York and District Field Naturalists. Goole Scientific: Annual Meeting.
- " 14. Manchester Cryptogamic. Yorkshire Naturalists' Union.—Excursion to Ingleton.
- " 15. Leeds Naturalists. Bradford Naturalists: Paper, "Cultivation of Ferns." J. W. W. Brooke.
- " 17. Selby Naturalists: Paper, "The Geology of the District." J. T. Atkinson, F.G.S. Bradford Scientific: Paper by C. H. Bothamley, of the Yorkshire College.
- " 18. Huddersfield Scientific Club: Paper, "Persistence of variation in Butterflies." S. L. Mosley.
- " 22. Leeds Naturalists.
- " 28. Lancashire and Cheshire Entomological.
- " 29. Bradford Naturalists: "A glance at Nature." W. West. Leeds Naturalists.

EXCHANGE, &c.

S. D. BAIRSTOW, Huddersfield, will be grateful for specimens of victimised caterpillars (during the approaching season), and also larvæ of ichneumons. Such assistance S. D. B. will duly recognise.

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RECENT STREET, CLOUCESTER.

AT a Meeting of the ENTOMOLOGICAL SECTION of the Yorkshire Naturalists' Union, held at Leeds on January 11th, it was decided to publish a LIST, with localities, &c., of the Lepidoptera of the county of York. Its compilation was placed in the hands of Mr. W. Prest, of York, and myself. May I ask, therefore, that every lepidopterist who has collected in any part of Yorkshire will kindly send list with localities of all the species noticed, with any notes that may be of use, to me, as early as convenient. I need scarcely say that all such assistance shall be fully acknowledged.

GEO. T. PORRITT,

Highroyd House, Huddersfield.

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MAY, 1879.

VOL. IV.

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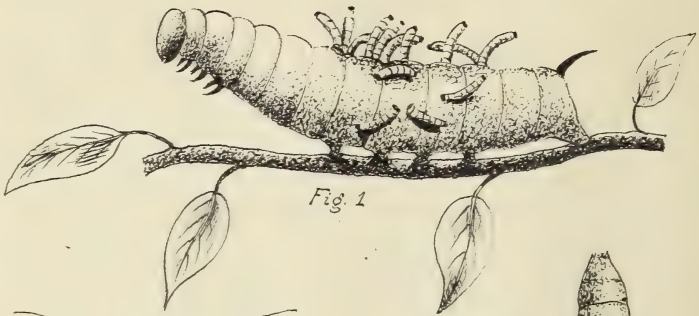


Fig. 1



Fig. 2a



Fig. 3



Fig. 2.



Fig. 3b



Fig. 3a

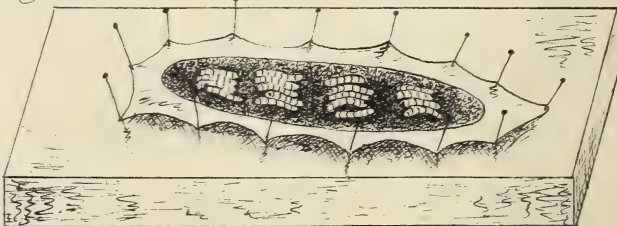


Fig. 1a

S.D. Bairstow, del. ad nat.

S.L. Mosley, del.

Original Articles.

ICHNEUMONIDÆ.*

By S. D. BAIRSTOW.

CHAPTER I.

Ni l'un ni l'autre.

“ And I have seen a man
In happy moods conversing with a fly ;
And as he.....
Beheld its wondrous eye and plumage fine,
From leaping scarce he kept, and perfect joy.”

WE are constantly in the habit of meeting with individuals who, in the ordinary course of conversation, refer in an indifferent manner to the various genera of that wide-spread and most important order, *Hymenoptera*. They term it abstruse. Now this wholesale condemnation of a grand study is scarcely fair criticism, yet we must allow that from a certain point of view it is correct. But the fact of abstruseness lies in the inadequate attention which scientists have bestowed upon it. Youngsters appreciate books which are replete with illustrations. Speculators and tradesmen place their money in funds which yield the most certain amount of profit for the least investment. Naturalists run after orders whose appearance and general qualifications render them fascinating and untroublesome. What can be better, they say, than to have a goodly cabinet of gorgeous moths, of well-arranged birds' eggs, or stuffed animals? But if this method of argument and selection were to predominate, Nature would degenerate into a plaything for infants, and natural history would develop into unnatural nonsense. Trees do not extend much unless by branching out. So, unless we strike out new paths for ourselves, avoiding muddy tracks of worn-out roads, attacking subjects least attacked, embracing studies neglected and perchance ridiculed, we may not hope to obtain any merit for ourselves. With this object in view I have taken up the pen, that, by offering a few interesting facts in connection with the *Ichneumonidæ*, others may be induced to think with me that, instead of being a dry science and obscure, it is really one of beauty, and intelligible, replete with life-lessons and instruction of no ordinary quality.

Nature is a compound of two immensely divergent systems—generative and destructive. The latter, though at first sight an

N. S., VOL. IV., MAY, 1879.

* Read before the Members of the Huddersfield Scientific Club, Feb. 14, 1879.

apparent absurdity in the work of vitality, is nevertheless as important and useful a requisition as the former. One adds, the other abstracts. We observe this principle involved in every phase of creation: without it, existence would be at cross purposes with itself, and obliteration must inevitably and indisputably ensue. Greater-bodied and consequently less prolific animals are, then, exterminated by the fearful fertility of minor ones. To counteract this obviously depressing and fatal superabundance, enemies are provided which keep a constant checkstring upon over-production, adjusted apparently to a nicety. To this class of benefactors (as we may safely call them) the family in question belongs. *Par exemple*, we are all aware how very common *Pieris brassicæ*, the familiar white butterfly, is throughout the summer. We all know that the food upon which the larva regales itself (garden cabbage, &c.,) is exceedingly abundant, and we know also how rapaciously the caterpillar eats, how rapidly it grows, how sudden are its metamorphoses, how fertile is the female insect. In short, then, if *Brassicæ* were permitted to breed so extensively with impunity, our cabbages would as extensively disappear, and we should be burdened with grubs instead of cabbages. What is the remedy? Some agency must be invoked to arrest the evil. And thus our little microgaster, by name *Apanteles glomeratus*, of world-wide renown, comes forward and renders the needful assistance. Anyone of an observant disposition will have noticed, in the summer time, a lot of small silky cocoons of a beautiful yellow hue, clustering about the niches or under the eaves of walls, and in various places, sometimes enclosing in their embrace the dead carcase of larval *Brassicæ*. They are the progeny of *Glomeratus*, at once the fiend of common white, and the gardener's friend. To breed and observe these tiny insects through all their stages and movements will repay us tenfold.

CHAPTER II.—LIFE HISTORY.

“Every mind was made for growth, for knowledge, and its nature is sinned against when it is doomed to ignorance.”

HAVING granted the utility and actual necessity of these insects, we would wish to see them in the act of warfare. Where can we do so? Let us take a trip into the woods, and scan the hedgerows as we journey, and, with time and patience, we may be rewarded. I say *may*, because it is much easier to study the effect than to discover the cause at work. It is possible to watch a caterpillar for a whole afternoon without the least approach of an ichneumon, but defeat must be defeated by re-application, and I do not doubt that ultimately

our hope will be realised. The ichneumon seems to be aware instinctively of the exact spot where the larva is located. Smartly promenading about its back, it takes in an ichneumon's eye-view of the scene, as if judging whether the opportunity and place are favourable. Is the specimen a well-fattened one, not sickly and likely to die, and as the Insurance Companies would term it—an ordinary risk? If satisfied on this point, the insect pierces the caterpillar with its ovipositor, leaving an egg at every stroke. The grub winces, but does not appear to take very great notice of the oppression, unconscious of the death-knell which seals its doom. One, twenty, perhaps a hundred eggs are deposited, our ichneumon has fulfilled a mission,

“ Not the least obeisance made he,
Not a minute stopped or stayed he,”

flying off as carelessly as possible, and leaving its future progeny to fate. The eggs soon hatch, and young grubs thus formed feed upon the food taken in by the caterpillar, or its natural fat, preserving or refusing the vital organs until such a length of time has elapsed for the perfect development of the grubling. They then burst through the sides or skin of their victim, and spin cocoons in which to pass their metamorphosis. Occasionally I believe the eggs are left on the outside of the larva, but this is a fact I have never personally noticed. The ichneumon strikes deep enough so as to prevent any hindrance to the caterpillar's development and various skin changes, and as a means of security for its young against such changes. Indeed the instinct of this genus presents a type of no ordinary quality. Even as the males of *Saturnia carpini* are intuitively apprised of the conduct of the females, and refuse any attractive agency after the event, so will an ichneumon refuse to deposit eggs in the body of a larva already stung. The smallest ichneumons are the most interesting and beautiful under the microscope.

“ Contrivance intricate, expressed with ease,
Where unassisted sight no beauty sees;
The shapely limb, and lubricated joint,
Within the small dimensions of a point.”

Things of beauty they may be, yet to the poor helpless victims—insatiate demons.

In the same manner as an entomologist is sometimes startled by perceiving in his breeding cage, instead of a fine bombyx, some gaunt and grim-looking ichneumon, so the hymenopterist will discover instead of a fine *Metopius*, as expected, some peculiar dipterous insect appearing out of the *Bombus* chrysalis. This is a drawback which will have to be encountered, and I would recommend the hymenopterist

as well as the other to pin all such supplanters in his cabinet along with the subjective type he studies. In mammalogy the ichneumon is an animal distinguished as the natural enemy and destroyer of snakes, crocodiles, birds, and various animals. From this creature the ichneumon-fly has derived its name, the two bearing in common a boldness and ferocity by no means insignificant. It would be difficult to specify what insects and other things are not preyed upon by these little demons, but we will content ourselves in naming a few. Of lepidoptera, both macro and micro are punished conspicuously, bombyces and noctuides, pyrales and tortrices, aphides, or plant-like species of cynips or gall-flies; others prey upon the eggs of spiders, taking up their residence in the cocoons. Dr. S. van Vollenhoven gives an example of two species of *Rogas* (*circumscriptus* and *testaceus*) discovered by M. Ritsema, of Haarlem, in January, within the *nests of birds*, "by which fact it is proved that some specimens are enabled to endure the winter frost in the state of imago (or perfect insect) by concealing themselves in birds' nests." This writer also informs us that some species of ichneumon pierce dipterous larva living in mushroom-rooms.

Of ichneumonidæ there are six sub-families, viz :—ichneumonides, cryptides, agriotypides, ophonides, tryphonides, and pimplides, comprising no less than 136 genera and 1186 species. It would take volumes to describe the distinctive qualities and peculiarities which make up these species, and even at the finish it is quite possible we might have as many more particulars to enumerate as those already touched upon, without regarding at all the problematic question of variety. We can, however, with safety classify them into two kinds, having regard solely to the method of ovipositing in the female imago, thus :

1. Ichneumons which require a sharp instrument to penetrate the skins of larvæ (Pl. iv., fig. 2, 2a);

2. Ichneumons which require a more mechanical arrangement, more complicate and sensitive, "to feel their way," pierce and deposit their eggs in the domiciles of insects, or into objects of solidity and strength (Pl. iv., fig. 3, 3a, 3b).

The first kind conceal their swords in sheaths, so to speak, the sharp cutter reposing in an abdominal groove; the second kind use instruments of a long thready appearance, composed of three distinct parts, each one in itself a lancet, the centre one being preserved when in a state of repose by the two exterior ones. The central cord ends in a point flattened, and jagged or indented towards it, forming, in this

manner, a most certain and formidable weapon. It would seem to be capable of piercing the most stalwart barrier of defence, and is wielded in a remarkably subtle and agile manner by its possessor. According to Reaumur it is "able to raise or depress it, and bend it in various directions." The insect often uses the foreleg with which to guide its ovipositor, in case of a difficult or invulnerable obstacle.

The cocoons of ichneumons are perhaps as compact in shape as those of any other orders in the insect world. Many lepidoptera, such as *Chelonia caja*, *Saturnia carpini*, some of the *Cuspidates*, the Japanese *Attacus (Bombyx) Yama-mai* are remarkably lavish and extravagant in the manufacture of their cocoons, whilst others again are equally slovenly and careless. Most ichneumons, however, show a precision and care characteristic of the gentility of the order. McLauvin, in his fluxionary calculations, could not have had an order better suited for his mathematical experiments. With some insects the cocoons made by the larvæ are so differently shaped, that the law of saving material and period is as variously employed as the methods used by those beings are changeable and numerous. But ichneumons would appear to have a more rigid rule of invariable form than most of their compeers.

(To be continued.)

LINCOLNSHIRE MARITIME PLANTS.

BY REV. W. FOWLER, M.A.

AT the close of a short paper on "Lincolnshire Coast Plants," in the *Naturalist* for April, 1878, I proposed to trace them at some future time along the banks of the Humber and Trent, as Dr. Parsons had traced the Yorkshire ones along the banks of the Ouse.* As might be expected, *a priori*, there is a general agreement between the results of his observations and the results of my own, the Trent and Ouse being both of them tidal rivers, though, owing to the greater breadth of the Ouse, and its course with relation to the Humber, the salt water probably reaches a higher point in Yorkshire than in Lincolnshire. For an examination of the plants occurring between Grimsby and Killingholme I am indebted to Mr. Cordeaux, of Great Coates; the banks of the Humber above Killingholme, and those of the Trent to Wildsworth (above Owston Ferry, below Gainsborough) I have myself examined; and though it is of course

* The paper by Dr. Parsons, to which reference is made, appeared in the *Naturalist* for March, 1876.

possible that I may have overlooked a plant or two, it is not probable that a further search would make any important addition to the list which I give. Of the plants mentioned in my former paper, some seem to require such decidedly maritime conditions for their development, that they do not appear above Grimsby; of the rest, the highest stations ascertained are the following:—*Cakile maritima*, *Triticum junceum*, Great Coates: *Statice Limonium*, *Suæda maritima*, Killingholme: *Armeria maritima*, *Triticum repens*, var. *littoralis*, *Hordeum maritimum*, *Atriplex littoralis*, Goxhill: *Artemisia maritima*, New Holland: *Spergularia marginata* (Syme), Ferriby: *Lepturus filiformis*, Winteringham: *Spergularia neglecta* (Syme), *Plantago maritima*, *Triglochin maritimum*, *Sclerochloa maritima*, Alkbro: *Glaux maritima*, *Juncus Gerardi*, *Sclerochloa distans*, Keadby: *Aster Tripolium*, Burringham: *Apium graveolens*, *Scirpus maritimus*, Susworth: *Rumex maritimus*, Ferry Flash.

Of quasi-maritime plants, *Trifolium fragiferum* occurs about Keadby and Burringham, *Samolus Valerandi* in the neighbourhood of Owston and Haxey, and *Plantago coronopus* at Burton Stather; to none of these three, however, does salt water seem to be a necessary of life, as they are frequently seen at considerable distances from either the sea or tidal rivers. As on the Ouse, so on the Trent, the three really maritime plants that ascend highest are, *Rumex maritimus*, *Apium graveolens*, and *Scirpus maritimus*; the last-named, however, was not flowering at Susworth, and seemed to be dying out. Between Owston Ferry and Gainsborough, none of the above-named plants were noticed; the following growing very luxuriantly, and occupying all available room on the banks:—*Ranunculus repens*, *R. sceleratus*, *Geranium pratense*, *Spiræa ulmaria*, *Angelica sylvestris*, *Valeriana officinalis*, *Dipsacus sylvestris*, *Tanacetum vulgare*, *Petasites vulgaris*, *Arctium majus* (Schk.), *Arundo Phragmites*, *Salix viminalis*, and twining about amongst them and over them, *Convolvulus sepium*, with its large white flowers.

Roughly speaking, the distance from Grimsby at the Humber mouth to Goxhill, at the north-east corner of Lincolnshire, is 15 miles—from Goxhill to Alkbro, near the Trent falls, 20 miles—and from Trent falls to Owston Ferry 20 miles more; from which it appears that a few maritime plants are to be found at least 50 miles from the sea-coast, not strictly speaking *inland*, but on the banks of a tidal river, at that distance from the sea.

Liversedge Vicarage,
Yorkshire.

PLAGIOTHECIUM ELEGANS (HOOKER).

BY JNO. WHITEHEAD.

I HAVE to announce the discovery of that rarely-fruited moss mostly known as *Hypnum elegans* (Hooker), with plenty of good capsules, near Barmouth, by myself and Messrs. Ashton and Percival. We first saw the plant with young fruit in Dec., 1876, but we visited the place again the following April, and gathered ripe capsules. My principal object in writing this notice is to question the identity of our British moss with the *H. elegans* of Hooker, and to claim for it the original name of *H. Borrerianum*, given to it by Dr. Spruce in 1846. Perhaps it may be as well to state that I brought a patch of the young fruit with me in Dec., 1876, and cultivated it, watching its growth daily during three months. A few weeks back I saw a copy of Hooker's "Musci Exotici," and was surprised to find that his figure and description of *H. elegans* differed in so many important characters from our plant. He describes and figures the fruit as drooping, as in *Bryum pendulum*, with the leaves scarcely pointed, and the inner peristome pale yellow, outer red—characters entirely at variance with our plant, which has the fruit horizontal and sometimes sub-erect, with the leaves much acuminate, and the outer and inner peristome pale yellow. I have mentioned the subject to the Rev. J. Fergusson, and he is also surprised to find that the two plants are distinct. I have also sent specimens to Dr. Spruce, who sent me an interesting and valuable letter in reply, from which the following is an extract.

"The moss identified by Wilson with Hooker's *H. elegans* I first called *H. Borrerianum*, Ms., in 1846, and gave it under that name to my friends, but it did not appear in print until 1851, when Karl Müller published it under my name in his 'Synopsis Muscorum.' In 1855 Wilson gave it as *H. elegans*, Hooker, in his 'Bryologia,' and in 1860 Schimper, in his 'Synopsis of European Mosses,' described the very same plant as *H. Mülleri*, Schimp. I never was quite satisfied with Wilson's determination, for Hooker's figure in 'Musci Exotici' shows lanceolate concave leaves *without any slender points*, and a capsule as pendulous as that of a *Bryum*. Lindberg, in his 'Manipulus Muscorum, Secundus, 1874,' says he has compared authentic specimens of the two, and found them quite distinct. The true *H. elegans* was gathered by Menzies at Nootka Sound, in 1787. The question of its identity with our British (and European) moss can only be decided by renewed reference to the Hookerian herbarium."

HYPNUM ELEGANS, AS DESCRIBED IN HOOKER'S "MUSCI EXOTICI."

Hypnum, caule procumbente ramoso, foliis distichis ovato-lanceolatis enervibus, apice subincurvis compressis, seta basilari, capsula cernua ovata, operculo conico-acuminato.

Caulis sesquiuncialis, procumbens vage ramosus. Folia flavo-virescentia, subnitida, bifaria, disticha, compressa, horizontaliter patentia, ovato-lanceolata, concava, enervia, apice solummodo serrulata, secunda. Perichætialia ovata, longe acuminata. Seta caulis inferiore parte inserta, vix unciam longa, erecta, flexuosa, apice incurva. Capsula ovata, cernua, operculum conico-acuminatum. Peristomii dentes, ext. rubri, int. flavi, segmentis ciliis interpositis.

A species in habit bearing no inconsiderable resemblance to *Hyp. pulchellum* (Leskea, Sp. Musc.) and *Silesianum*, but differing from the former in the leaves being serrated at the points, and from the latter in the points alone being serrated, and from both by the singularly drooping capsules.

REFERENCES TO PLATE V.

FIG. 1.—*Hypnum elegans*, Hook. Musc. Exot.

- a. Plant, natural size.
- b. Capsule and seta magnified.
- c. Leaves do.
- d. Perichætial leaves.

(After Hooker.)

FIG. 2.—*H. Borrerianum*.—Spruce. The plant referred to by Mr. Whitehead from Barmouth.

- a. Plant, natural size.
- b. Capsule and seta magnified.
- c. Leaves do.
- d. Perichætial leaves.

Short Notes and Queries.

MIGRATORY ARRIVALS.—I saw a swallow on the wing in the Ryburn valley, on the morning of April 11th; the wheatear on Norland Moor, on the 7th; and a few willow wrens had arrived by April 9th.—F. G. S. RAWSON, Thorpe, Halifax, April 17th.

THE EAGLE OWL (*Bubo maximus*) IN CAPTIVITY.—Three living specimens of this beautiful bird are now being exhibited in Roundhay Park, near Leeds. The largest, a female, was taken on Rombalds Moor in 1876; the other two are young birds, male and female, taken out of a nest last August, about twelve miles north of Aberdeen. They are kept by Mr.

Todd, photographer, in a small room built on purpose for them. During the day they are generally asleep, but as night advances they become very noisy. Their hooting at night may be heard at a considerable distance. The barn and tawny owls of the neighbourhood come and perch on the roof above the eagle owls, and answering them by their respective cries, keep up a dismal concert all night through. This only ends with the approach of morning, when the wild birds retire, and the prisoners fall into a deep slumber. The food of the captive eagle owls consists of meat, rats, and other vermin. They will consume in a week 14lbs of meat, besides a dozen rats. This no doubt seems enormous, but I can personally vouch for the truth of it. I have seen them swallow pieces of meat weighing two ounces. These fine birds are very cleanly in their habits, washing themselves in clean water every morning; and it is singular that they will never wash twice in the same water. It is a shame to see these noble birds in captivity, but were they set at liberty tomorrow, dozens of men would be out with their guns, and never rest till they had entirely driven them away, or laid them dead at their feet, such being the unfortunate, not to say culpable, propensity for destruction which characterises the Englishman who sees a noble or rare bird before him—a propensity the result of which is the gradual extermination of all our rare birds.—WALTER RAINE, 5, Leeds Terrace, North-street, Leeds, March 25th.

NEST AND EGGS OF MOORHEN.—During an excursion to Strensall Common last spring, I came across a nest of the common *Gallinula*, containing 26 eggs—an enormous quantity, the usual number being eight or nine. The eggs were in three distinct batches; seven or eight were very similar, being of a warm stone colour, marked with large, rich brown spots. Another lot were considerably smaller, and were very slightly freckled with rust colour; while the third batch differed entirely from either of the preceding. I think this is sufficient proof that three moorhens must have laid their eggs in one nest—an instance which I think has never been known to occur before. The nest which contained them was as large as and similar to that of the coot. It would be interesting to know whether the three birds did their share during incubation, or the original owner of the nest was left in charge of the whole.—W. RAINE, Leeds, April 16th.

Aulacomnium turgidum.—Neither of the two notices of *Aulacomnium turgidum* given in the last number of the *Naturalist* is quite accurate, and I therefore trouble you with this short note. Specimens of the Whernside plant were submitted to Mr. Boswell in August last, and were at first regarded by him as *A. palustre* var. *imbricatum*, Schpr., which is *A. turgidum* of Funk, but not the true *A. (Mnium) turgidum* of Wahlenberg and of recent authors. The first specimen from Whernside which I saw was sent to me by Mr. Lees on the 23rd October last, and was marked "*A. palustre*, var. *turgidum*." The next was sent by Mr. Wesley on the

24th, and marked "*A. palustre*, var. *imbricatum*, Schpr.....*A. turgidum*, Funk. et al. in litt." I pointed out to both gentlemen that the Whernside plant was not *A. palustre* var. *imbricatum*, Schpr., or *A. turgidum* Funk, but *A. turgidum*, Wahlenberg, a conclusion at which Mr. Boswell had arrived some time previously, on his re-examination of the plant. Until to-day I was under the impression that he had done so only after he had seen or heard of specimens of *A. turgidum*, Wahl., from Ben More, but it appears that he had done so altogether independently of them. In any case Mr. Boswell was the first to identify the Whernside plant. I had, however, something to do with the identification, or, perhaps, to be more precise, with the final determination of the Ben More specimens; and I can assure Mr. Lees and Mr. West that they are quite wrong in their guess as to the time when this took place. Instead of being October or November, it was certainly not later than the first week of September. Mr. Boswell is satisfied that the Ben More specimens were correctly and unhesitatingly identified, before the Whernside ones were so—not after, as Mr. Lees and Mr. West imagine; and with what satisfies Mr. Boswell, Mr. Lees I think must remain contented. While writing on this subject it may be as well to state that Mr. Holmes is mistaken in supposing that *Aulacomnium turgidum* is found only in a barren state on the Styrian Alps. Several years ago fruiting specimens were gathered there by the distinguished Austrian bryologist, Mr. Breidler.—J. FERGUSSON, The Manse, Fern, Brechin.

Rainfall for March.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·86	18	5·08	* 10·14	17	0·44
LEEDS ... (H. Crowther) ...	183	1·42	19	5·55	...	13	0·16†
HALIFAX... (F. G. S. Rawson)	360	2·97	16	8·79	10·53	...	...
BARNLEY ... (T. Lister) ...	350	1·13	19	4·70	3·86	16	0·17
INGBIRCHWORTH (do.)	853	2·02	22	6·42	6·97	16	0·23
WENTWORTH CASTLE (do.)...	520	1·26	15	5·15	4·41	16	0·31
GOOLE ... (H. F. Parsons)	25	0·65	12	4·44	2·68	17	0·21

* This is the average to date for 13 years, 1866-78.

† This fell as snow.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting April 15th, Mr. T. Lister presiding.—A present to the Society's museum of a few cases of birds, animals, and shells, chiefly foreign, by the widow of the Rev. H. Bowen Cooke, late rector of Darfield, were examined, and thanks voted for the gift. A few observations on birds were made by the president, who stated that he heard and saw the chiff-chaff on April 5th; it was believed to be heard, but not seen, March 31st. The wheatear and meadow-pipit had been also noted. Mr. Senior of Tyers-hill, reported the cuckoo seen on the 7th April, but its note was not heard; the president saw three willow wrens on same occasion. With these exceptions spring migrants are late.

BRADFORD NATURALISTS' SOCIETY.—Meeting March 18th, Mr. Illingworth in the chair.—Messrs. Andrews and Hopwood showed *C. flavicornis*, taken at Saltaire on March 9th. Mr. H. Hebblethwaite gave a paper on "Our Coasts," which was followed by an animated discussion.

MEETING April 1st, Mr. Illingworth in the chair.—Mr. West gave a paper entitled "A Glance at Nature."

MEETING April 16th, Mr. Firth in the chair.—Mr. Brook gave a thoroughly practical paper on "The cultivation of Ferns," including the raising of them from spores.—WM. WEST, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, April 16th, Mr. Garside in the chair.—Mr. J. E. Crowther exhibited a pair of merlins; Mr. F. Lumb the Colorado beetle; Mr. J. H. Stott a good collection of fossils, obtained in the neighbourhood. Owing to the late season, not many botanical specimens were brought. The Society have purchased a microscope during the past month, for the further study in the different branches of natural history.—W. H. STOTT.

GOOLE SCIENTIFIC SOCIETY.—Annual meeting, Dr. Blair, vice-president, in the chair.—The annual report, which was read by Dr. Parsons, the hon. sec., and which was afterwards ordered to be printed, stated that during the year the Society had on the whole maintained its prosperity. The number of members had progressed from 70 to 100. Dr. Parsons, F.G.S., was elected president, and Messrs. Bunker and Birks secretaries.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting April 18th, Mr. S. L. Mosley, vice-president in the chair.—Mr. C. P. Hobkirk exhibited specimens of the following mosses, found in the recent excursion of the Yorkshire Naturalists' Union:—*Fontinalis gracilis* and *F. antipyretica* (Malham Cove), *Climacium dendroides*, *Thamnium alopecurum*, fr., and

Neckera crispa, fr. (Clapham). In lepidoptera Mr. G. T. Porritt shewed several specimens of *Nonagria brevilinea*, taken by Mr. Fletcher at Ranworth Fen last year; a specimen of *Pachnobia alpina*, taken in Scotland by Mr. F. D. Wheeler; and a series of *Crambus uliginosellus*, taken at Darlington by Mr. Sang. The chairman, a very curious pale variety of *Cymatophora flavicornis*, taken in the district (Black Fir Wood) two or three weeks previously. The chairman then read a very interesting paper entitled "Persistence in variation in British Butterflies,"* illustrated by a large number of beautifully-coloured drawings.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting, March 31st, the president in the chair. A paper was read by Mr. Fish, on "The objects of the existence of insect life," which gave rise to considerable discussion. The president drew attention of members to a pamphlet by Mr. C. S. Gregson, which was read by the secretary. In this treatise Mr. Gregson explains the facility afforded by chemistry for the manufacture of spurious varieties of lepidoptera.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—326th meeting, March 18th, 1879, Mr. C. H. Bothomley in the chair, who read a short paper on "Quartz," and exhibited a very fine series of illustrative specimens. Various interesting eggs were shown by Mr. Walter Raine, and one of the black swan, from Geelong, by Mr. Roebuck. Mr. Turner stated that the Roundhay gathering made on the 9th March, contained *Squedra ulva* and *splendens*, *Diatoma vulgare*, and *elongatum*, *Fragillaria capucina*, *Amphipleura pellucida*, *Gomphonema acuminatum*, *Nitzschia tænia*, *lanceolata* and *sigmoidea*, *Surirella bifrons* and *ovata*, *Cocconeis pediculus*, *Melosira varians*, and a form much like *Cymbella*; also in great numbers *Cocconema lanceolatum*: in all 16 species.

327TH MEETING, March 25th, Mr. Barwell Turner in the chair.—Mr. John Grassham reported that a fine male merlin (*Falco aesalon*) was shot near the White Horse, York-road, Leeds, about the 20th of March; also that he had seen a fine peregrine (*F. peregrinus*) shot at Malton the preceding week. Mr. W. E. Clarke reported that he saw a chaffinch on the beck-side at Meanwood, on the 23rd March, the date being very early for this district. He exhibited a variety of the rough-legged buzzard (*Buteo lagopus*) so peculiar in its markings as almost to resemble a Greenland falcon. Mr. Walter Raine showed eggs of the ostrich and emu, and a discussion arose as to their methods of nidification.

328TH MEETING, April 1st, Mr. W. E. Clarke, treasurer, in the chair.—Mr. W. H. Hay exhibited a specimen of rock from Niagara. Among the numerous exhibits by the microscopists, Mr. W. Clarke showed slides of insects' wings of various species, Mr. F. Emsley various local diatoms and

* We shall print this paper shortly.

algæ. The Society's cabinet was enriched by the gift of several slides from Messrs. W. B. Turner and W. E. Clarke. Mr. Turner showed a number of mosses collected by a friend of his in the Lake district, including *Neckera crispa*, *Hypnum denticulatum*, *Climacium dendroides*, *Thamnium alopecurum*, *Hylocomium triquetrum*, *H. splendens*, *H. brevirostre*, *Hypnum pulchellum*, *Splachnum ampullaceum*, *Bartramia Halleriana*, *Bryum Zierii*, *Pogonatum urnigerum*, *Dicranum majus*, &c.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, 21st April, Mr. J. Whitehead, president, in the chair.—From Mr. E. M. Holmes, of London, the secretary (Mr. Rogers) said he had received two mosses—*Trichostomum subulatum* (fr.) and *T. littorale*—both extremely rare species, for the Society's collection. In a note Mr. Holmes said that the former species he found in yellowish clay-slate soil, in shady hollows and hedge banks, along with *Bryum Tozeri* and *Schistostega osmundacea*. He has gathered it at Saltash, at Sunny Corner, Truro, and at Bickleigh Vale, Devon. In the first-named locality the original discoverer was Mr. F. Brent; near Truro it was first observed by the Rev. Mr. Tozer, and afterwards by Mr. R. V. Tellam. The president mentioned the finding by himself of what he believed to be *Trichostomum Bambergeri*, near Barmouth. This moss, if his surmise be correct, will be an acquisition to the British flora. He also exhibited specimens of *Grimmia Schultzii*, which he found growing abundantly, in fruit, upon *Cader Idris*; also the very rare *Leskea latebricola* with male flowers; and *Didymodon cylindricus* (fr.) of which five capsules only were gathered during the late Barmouth excursion. The latter species was first found in Wales by the late Mr. W. Wilson. Another moss from *Cader Idris* was *Andreæa petrophila*, in fine condition. The president exhibited specimens of the very rare *Hypnum demissum*, gathered by Dr. Carrington last week near Barmouth. Killarney and Beddgelert were previously the only known stations for the species in this country. *Trichostomum niditum*, lately gathered in Anglesey by Mr. P. Rogers, was distributed by the secretary. A communication was read from Mr. W. H. Pearson, enclosing specimens of two *Hepaticæ*—*Adelanthus decipiens* and *Jungermannia Schraderi*, collected by Dr. Carrington and himself, on the 12th inst., near Cefn Coch, Merionethshire. The former species has only been found previously in Cornwall, the West of Ireland, the West Indies, and the Andes (see Spruce, in *Journal of Botany*, 1876). The last-named species was found many years ago in Scotland by Drummond, and more recently it had been gathered by Dr. Carrington in Glen Finnan, Invernesshire, and by Mr. G. Stabler in Westmoreland. No other station is known for it in the British Isles.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, April 2nd, Mr. Spurling, v.r., in the chair.—Mr. Wigglesworth read a paper on "A Sacred Animal," the subject being taken from Leviticus chap. 21,

v. 22, this being the only passage in Scripture which contains the word "beetle." Some writers inclined (said the essayist) to the opinion that the word was wrongly used, and that some kind of locust was indicated by it : while the late Mr. Molyneux suggested that it was "that very kind of *Scarabæus* which the idolatrous Egyptians of old held in such high veneration as to pay it divine worship, and engrave its image on their obelisks." Mr. Sims formally announced that by subscription of a few members a handsome cabinet had been purchased and presented to the Society.

YORKSHIRE NATURALISTS' UNION.—The excursion season of 1879 was opened by a field-day among the mountains, with Ingleton for rendezvous, on Easter Monday, the 14th April. For some days before, the ground was worked over in advance by various parties of members, while on the day itself the attendance was quite up to the average, there being on the ground between 60 and 70 members, representing in all 14 Societies, while 13 were entirely unrepresented. Various parties were organised. One was led by Mr. Isaac Hindson, of Kirkby Lonsdale, who as a botanist and geologist was well known to, and a frequent companion of, Prof. Hughes and Mr. R. H. Tiddeman, when engaged on the geological survey of the district. Another which was headed by the Rev. William Fowler, M.A., was accompanied by Mr. Joseph Carr, of Ingleton. A third detachment made for the summit of Ingleborough, while various members took isolated directions. After tea at the Wheatsheaf, and sections at the National School, the general meeting was opened in the school at 5-30 p.m., the chair being occupied by the Rev. W. Fowler, M.A., ex-president. A long list of 48 new subscribers to the funds (mainly the result of the recent exhibition at Leeds) was read, and thanks voted. The list included Mr. John Barran, M.P., Prof. A. H. Green, Mr. Isaac Hindson, and several Lancashire naturalists. Mr. J. W. Davies, F.L.S., of Halifax, moved a vote of thanks to the Rev. T. D. Sherlock, M.A., vicar of Ingleton, for the use of the schools, and to Messrs. I. Hindson and J. Carr for conducting parties, which was passed. Mr. Carr replied. A vote of thanks to the local secretary was afterwards passed. Mr. W. E. Clarke, of Leeds, secretary of the Vertebrate Section, reported that ornithology was the only branch which had been attended to, that birds and observers had both been scarce, and that this, with the lateness of the season, would account for the shortness of the list. The birds observed were:—Residents 26, including the dipper, cole and marsh tits, carrion crow, and curlew ; summer migrants, only 2, the ring ouzel and tree pipit. Birds observed breeding :—dipper, two nests observed, one of which contained four eggs ; carrion crow, a nest with three eggs. Mr. E. B. Wigglesworth stated, in the absence of the officers of the Conchological Section, that the shells found would be submitted to competent authorities, and in the absence of the officers of the Entomological Section that the earliness and backwardness of the

season, and the cold and dull weather of the day, had reduced the captures of insects to a minimum. Dr. Parsons, of Goole, secretary to the Botanical Section, reported that the places visited had been Ingleton, Helk's Wood, Thornton Force, Chapel-le-dale, Weathercote Cave, Ingleborough, Whernside, Dent, Sedbergh, Howgill Fells, Bow Fell, Hawes Junction, &c. Owing to the earliness of the date, and the backwardness of the season, few flowering plants had been observed compared with what would have been seen later in the season. The district, owing to its great variety of soil and diversity of surface, would no doubt yield a rich and varied flora. As it was, 103 phænogams were observed, including several rare alpine species, as *Alchemilla alpina* (Cautley Spout), *Saxifraga oppositifolia*, plentiful and in flower on an escarpment of Yoredale limestone, high up on Ingleborough; also *Draba muralis*, *Alsine verna*, *Rubus Chamæmorus*, *Sedum Telephium*, *Saxifraga hypnoides*, *Chrysosplenium alternifolium*, *Vaccinium Oxycoccus*, and *V. Vitis-Idæa*, *Taxus baccata*, and *Sesleria cærulea*. Ferns and their allies were plentiful, 19 kinds having been observed, including *Hymenophyllum unilaterale*, *Cryptogramme crispa*, *Asplenium viride*, *Lycopodium clavatum*, *Selago* and *alpinum*, *Selaginella selaginoides*. In mosses and lichens the district had proved extremely rich, the variety and luxuriance of the kinds met with far exceeding anything seen at any previous meeting of the Union. Of the different kinds of rock met with in the district, each yielded its own particular mosses and lichens. It was remarked that the mosses and lichens characteristic of alpine regions descended lowest on the slate, whereas the common lowland kinds ascended highest on the limestone. The total number of mosses, so far as hitherto made out, is 130, including *Andreæa rupestris*, *Gymnostomum squarrosum*, *Dicranella squarrosa*, *Seligeria pusilla* and *recurvata*, *Distichum capillaceum* (fr.) *Encalypta rhabdocarpa*, *Grimmia orbicularis* and *Donniana* (fr.) *Racomitrium* five species (fr.) *Amphoridium Mougeotii*, *Ulota intermedia* (fr.) *Orthotrichum Lyellii* (fr.) *Splachnum sphaericum*, *Bartramia Oederi*, *Breutelia arcuata*, *Zieria julacea*, *Mnium stellare*, *Polytrichum strictum* (fr.) *Diphyscium foliosum* (fr.) *Hedwigia ciliata* (fr.) *Pseudo-leskea catenulata*, *Hypnum ochraceum* and *scorpioides*, *Hylocomium loreum* (fr.) and *brevirostre*. Many rarely fertile mosses were found in fruit, as *Eucladium verticillatum*, *Plagiothecium undulatum*, *Hylocomium triquetrum*, &c. The Hepaticæ included *Reboulia hemisphærica*, *Gymnomitrium concinatum*, *Madotheca lævigata*, &c. Of lichens, upwards of 50 species were recognised, including *Sphærophoron coralloides*, *Stereocaulon coralloides*, *Cetraria islandica*, *Peltigera horizontalis* and *aphthosa*, *Solorina saccata*, *Stictina fuliginosa*, *Parmelia caperata*, *perlata* and *conspersa*, *Umbilicaria proboscidea*, *Placodium candicans*, *Lecanora ventosa*, *aurantiaca*, *atra*, *cinerea* and *badia*, *Lecidea geographica*, and *Endocarpa miniatum* and *fluvatile*. These lists will no doubt be largely added to, when the examination of the specimens is completed. —Mr. C. H. Bothamley, of

Leeds, reported the proceedings of the Geological Section. A discussion followed as to whether the conglomerate at the base of the carboniferous limestone was of carboniferous or devonian age. The speakers were Dr. Parsons, Mr. J. W. Davis, and Mr. C. H. Bothamley. The conclusion arrived at was that the conglomerate represented the bottom of the ocean in which the limestone was deposited, and was of the carboniferous period.—W. D. R.

YORKSHIRE NATURALISTS' UNION EXHIBITION.—*Botanical Report*.—

The room allotted to the Botanical Section was the smallest of the rooms occupied by the exhibition, and consequently it was not possible to display more than a tithe of the specimens sent in, though tables were crowded and walls tapestried with them. An exhibition of botanical specimens, especially if held, like the present, at a time when it is impossible to procure living plants, must necessarily be more attractive to the botanist than to the æsthetic lover of flowers, for the graceful forms, vivid colours, and sweet odours of living foliage and flowers cannot be preserved in the herbarium, being more or less completely lost in drying : hence, while stuffed birds, butterflies, and shells are beautiful and attractive objects in the cabinet, a collection of dried plants to a non-botanical beholder is only so much "Latin hay." The only exhibitor who attempted to treat his subject artistically was Mr. J. R. Murdoch, who exhibited with other specimens an elegant wreath constructed of various species of mosses, and surrounding an appropriate quotation. As objects of beauty, we must also mention an admirably-dried series of marine algæ from the Isle of Man, exhibited by Mr. Thomas Hick. To the botanist, however, there was much to interest and instruct. Mr. A. Carr, of Sheffield, besides a number of other specimens, sent an excellent series of brambles and roses, which, though suggesting to the superficial observer the thought—"Cæsar and Pompey, very much alike, specially Pompey," were full of interest to the botanical students who have mustered sufficient courage to attack these thorny and puzzlesome plants. The specimens of each species contained, mounted on one sheet, the flowering shoots, the fruit, and the barren stem ; the only thing wanted to complete the illustration being a sketch of the plant to show the habit of growth—an important character which cannot be shown in a herbarium specimen. Yorkshire and other British flowering plants and ferns were shown by the Goole Scientific Society and others ; a herbarium of North American plants by Mr. W. West ; and a collection of alpine plants from Switzerland by Dr. Parsons, who also exhibited mosses, hepaticæ, lichens, and fungi from Yorkshire and the south of England. Some of the discoveries of the past year were on view, as *Aulacomnion turgidum* from Whernside, *Carex capillaris* from Gordale, *Limosella aquatica* from Rawcliffe, *Carduus acaulis* from Lindrick Common, &c.

Diary.—Meetings of Societies.

- May 1. Bradford Scientific Association.
" 6. Bishop Auckland Naturalists'. Liversedge Naturalists'.
" 7. Wakefield Naturalists'.
" 6. Huddersfield Scientific Club.
" 10. Yorkshire Naturalists' Union :—Excursion to Harrogate and Pateley Bridge.
" 12. Manchester Cryptogamic Society.
" 13. Bradford Naturalists': Paper on "Embryology,"—Mr. Frank Bamford.
" 14. York and District Naturalists' Field Club.
" 15. Bradford Scientific Association.
" 26. Lancashire and Cheshire Entomological Society,
" 27. North Staffordshire Naturalists' Field Club :—Excursion to Donington and Kegworth, in conjunction with the Buxton Club.
" 27. Bradford Naturalists': Paper by Mr. B. Spencer.
" 29. Bradford Scientific Association.
-

EXCHANGE, &c.

S. D. BAIRSTOW, Huddersfield, will be grateful for specimens of victimised caterpillars (during the approaching season), and also larvæ of ichneumons. Such assistance S. D. B. will duly recognise.

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At a Meeting of the ENTOMOLOGICAL SECTION of the Yorkshire Naturalists' Union, held at Leeds on January 11th, it was decided to publish a LIST, with localities, &c., of the Lepidoptera of the county of York. Its compilation was placed in the hands of Mr. W. Prest, of York, and myself. May I ask, therefore, that every lepidopterist who has collected in any part of Yorkshire will kindly send list with localities of all the species noticed, with any notes that may be of use, to me, as early as convenient. I need scarcely say that all such assistance shall be fully acknowledged.

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No. XLVII.

JUNE, 1879.

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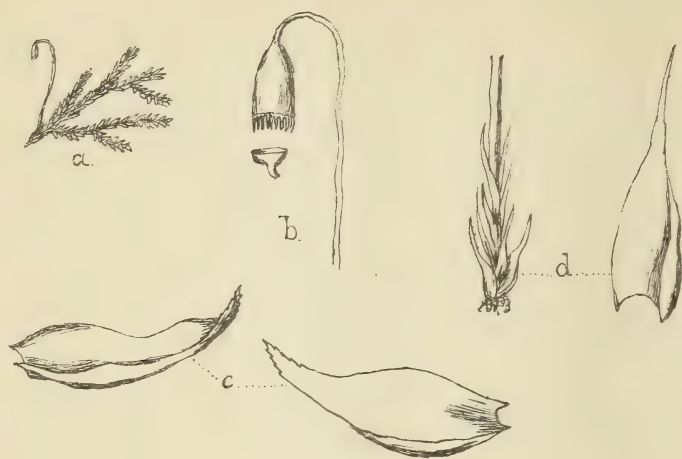


Fig. 1.

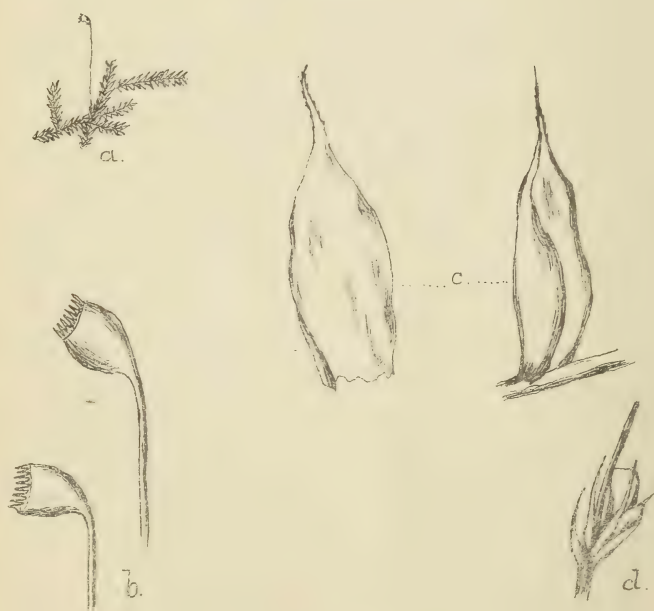


Fig. 2.

C. P. Holkirk del. ad. nat.

Original Articles.

ICHNEUMONIDÆ.

By S. D. BAIRSTOW.

(Concluded.)

CHAPTER III.—WAYS AND MEANS.

“Of writing well these are chiefest things,
To know the nature and the use of things !”

SUMMER sunshine allures thousands of these pert little insects from their hiding-places. With sparkling, glistening wings

“Whose azure floats in liquid fire”—

wings whose hue it would be difficult to define, and

“Must all the painter’s art defy,
And bid him from the task retire”:

and with sharp, active motions they seem ever to be alert in quest of sustenance and enjoyment. Indeed, when viewing their whole demeanour one is struck with the notion that life and life’s blessings are relished to the uttermost degree. They are generally easy to catch, being of such careless dispositions. An ichneumon’s location recognises no law of defined certainty: I find them by keeping my eyes open. The way to make a collection, however, is by netting and boxing every glittering fly which comes within one’s reach. This wholesale imprisonment idea smacks of cruelty, but only applies to mere naturalist novices, as the more advanced ichneumonologists are very soon enabled to form an adequate idea as to which insects they require, and which they do not. Every species should be placed with a number and small piece of paper attached, descriptive of locality, date of capture, and full particulars; or, better still, index your note-book, and detail all memoranda there corresponding with the numbers in the cabinet. As my friend Mr. G. T. Porritt would observe, “the best instructor of a naturalist is his note-book.” Let me inform intending students that ichneumons require care and diligence illimitable, and unless they are prepared to take up the gauntlet in real earnest, it is better left untouched. If it is to be done at all, let it be well done. Another method of capture is the ordinary one employed by entomologists in larva-getting, viz., shaking the branches of trees into an umbrella or contrivance made for the

purpose. Along with a medley of rubbish and insect life, the result will reveal most likely plenty of ichneumons. On arriving on the "gingham," they appear to be momentarily paralysed and bewildered, but long before "time" is called, and unless one is very quick and active, the little insect recovers from its temporary embarrassment, and flies away, perchance laughing at your gaping mouth and astonished features. Anticipate escape by prompt action, out with the pill-box, and in with your *Pimpla*, or whatever it proves to be.

But the difficulty of obtaining specimens is by no means insuperable; the difficulty is in getting them well named when caught. Let the collector once obtain a start in the nomenclature of insects by getting well acquainted with the more common ones, and the rest will soon follow.

Breeding is an essential and interesting part of the programme, and well worth a lot of trouble. It facilitates observation and the taking of notes, fixing upon memory facts worth working for, and which no amount of out-door labour could as effectually realise. I always prefer to keep my chrysalis cage moderately damp, and for this purpose adopt the practice of growing some moss in it. The cage is divided into two compartments by a glass square, one half covered with moss on the bottom, and the other portion strewn with twigs, rotten wood, and dry earth, giving free access for the insect or larva to choose its own whereabouts. The glass division may be shaped according to the ingenuity and desire of the workman. At the top is a spiral-spring shaped glass tube, perforated with holes to allow the water poured into it to drop into the cage. By means of an ordinary funnel made to fit into the top end of the tube, water can be passed into it at any time when required. The base of the wetted half of cage should also be well perforated so as to prevent stagnation, the partition let into the wood deep enough to prevent the water from the wetted half travelling through, and directly underneath the former a tank or basin is placed to receive the water. If this basin is adopted a tube may be fixed through the bottom, and by this contrivance a small branch of a tree or a plant can be used for a considerable period, and constantly renewed, adaptable for feeding larvæ if required, receiving a supply of water from the basin and through the tube, which must be corked up when in disuse. Something of this character will be found very useful, especially when all our feeding-cages are taxed to the uttermost, and when saving time is an object with the breeder. As the period comes round for the larva to select

a convenient spot wherein to undergo its metamorphosis, there will then be offered plenty of places and ample room to suit the most fastidious taste, and the cage will come in alike useful both to grub and to breeder. Every workman prefers good tools, and I must confess, for my own part, to a decided partiality for adaptable apparatus.

Ichneumons do not succumb to fumes of potassic cyanide, chloroform, or laurel leaves as soon as do various genera of lepidopterous insects, and very often when released from the killing bottle we notice with chagrin that they are "coming round"; nevertheless as facile and expeditious methods of removal for larger-bodied ones, such as some of the genus *Metopius* or *Amblyteles*, and others, I cannot find better. Numerous entomologists strap their insects to setting boards, by means of small slips of card, through the extremities of which pins are pierced, and into the wood at either edge of the wings, thus avoiding damage, yet firmly fixing them. Now this is undoubtedly a fair idea for lepidoptera, as the wings of moths and butterflies are feathered, and very liable to be defaced; but it scarcely acts as efficiently for hymenoptera. The wings of ichneumons are similar in texture to the wrappers employed for sweet-packets, consequently the smooth surface renders them likely to slip away from the card, and when we return to unstrap them from the setting-board, to our astonishment the insect is set certainly, but quite unfit for any cabinet. The better plan is to use thread and wind it around both insect and board. It can do your ichneumon very little if any harm. By drawing the thread around and across we can fix our capture without fear of accidents. Where a travelling case is used, the cardboard slips are apt to produce insect slips, bodies and wings falling out of position. Loose setting boards have numerous and obvious disadvantages, and though answering in part for home use, they are utterly inadequate for journeying purposes. I would advise every collector to keep a travelling-case. Setting-boards must be of different dimensions, to suit all sizes of insects, and each one is spliced with a wooden base to run in a groove, the whole kept in position by the lid when closed. Drawers will be found useful, also corked lid and an empty shelf. The box can be manufactured with two lids if desired, so as to provide a case arrangement, in which to deposit the insects when taken from the boards.

Mr. W. D. Roebuck's advice (quoted from Ent. Ann. 1874, p. 128, by Rev. T. A. Marshall) is as follows:—"Any small-winged hymenopteron, if left to itself is sure to dry with the wings doubled up, or

concealing the characters of the abdomen, &c., in some way that renders its identification or description impossible. Much has been said against carding specimens intended for examination, but the objections apply less to parasitic hymenoptera than to most other kinds of insects. The parts of the mouth are only of secondary value, and the leading characters are nearly always taken from the upper surface. Without knowing what others may be able to do, I can say for myself that I rarely succeed in naming small obscure specimens unless neatly displayed upon cards. As to running pins through the thorax or scutellum, obliterating the most characteristic parts of the body, it is generally throwing away all chance of identification. When a small insect of this kind is carded, the legs should be stretched sufficiently to allow a side glance of the coxæ, which are often important; and if the head is prevented from resting forehead downwards on the card, so that the face can be seen, the maximum of convenience will be attained." Notwithstanding this most excellent *modus operandi*, minute species are yet and will ever be difficult to identify on cards, as whatever portion of the insect is fixed to the paper, it must necessarily be out of sight and out of mind. The entire frame of a small insect subjected to microscopic examination for determining, must by reason of its smallness be important in its entirety—hence the dilemma. For average-sized hymenoptera (small yet not minute) I find that a slender pin glued underneath the centre of a small paper slip, and over which the insect is gently fixed, allows facility for bending the paper and obtaining the requisite scrutiny. For the most minute insects use strong card-braces shaped to a point,—and place the specimen as far on the end as the acuteness of the point and adhesiveness of gum will permit. Where more than one is admitted into the cabinet, more than one brace can be supported by the pin.

CHAPTER IV.—THE CABINET.

Each youthful collector is inspired with ideas the practical realisation of which is often contracted by the limits of the purse. When a few insects are gathered together, or even whilst there is

“About his shelves
A beggarly account of empty boxes,”

a glorious notion gradually insinuates itself into his mind, and he must have a cabinet at all hazards. Every power is invoked, and no stone left unturned which can possibly assist in the achievement of this grand object. It is, nevertheless, a mistake equally premature and mischievous. Never buy a cabinet until able to obtain one of a

first-rate quality; let it be of such a character that it will last a lifetime, and be satisfied that the manufacturer is up to this sort of thing. What can be more annoying, after expending several pounds upon a cabinet, after using every endeavour to place our insects in good and scientific array, and after working hard and long, to find a great big crack on the outside of the case, gradually but most surely widening—a consequence of inferior workmanship or of badly-seasoned wood? Again, consign the cabinet to the care of an “old hand.” My own is made up of cases book-shaped, bought at intervals until the whole of the order taken up is represented either by insects themselves or by names. The book shape I prefer on account of its being a superior preventative against dust, contrasted with drawers which lay flat in the cabinet and give more freedom of access for the dust to accumulate. I may be possessed of somewhat old-fashioned prejudices, yet notwithstanding all the agitation about the question of mite-destroyers, and the particularly vindictive epithets applied to the use of camphor, I have still a lingering regard for, if not belief in, the efficacy of that estimable commodity. If it does no good, it can certainly do but little harm. When used, a small receptacle or incision should be made in some portion of the case, to prevent the crystals from tumbling amongst the insects, and causing demolition or accidents. Whether a ridiculous preventive of these little *Acari* or otherwise, it is a fact that my own specimens have not been extensively victimised, and it is equally a fact that I have used no other “destroyer”; but failing camphor (as I am well aware of the existence of powerful objections), corrosive sublimate and benzo-line are very good. Let the insects be numbered respectively in the cabinet, and a book kept to correspond, with all necessary particulars, adjacent. Marshall’s catalogue, rebound with interleaves, answers all requirements.

CHAPTER V.—LITERATURE.

One of the greatest difficulties one has to contend with in the study of parasitic hymenoptera is exposed in this fact—the literature is scanty and mostly foreign. Of late years, however, the number of books has been largely and efficiently augmented, and I believe several works on this subject are at this moment in course of publication. To the student two things are altogether indispensable—a good corresponding authority, and a British catalogue of known species. Of the latter no better is extant than the one published by Rev. T. A. Marshall (a work already alluded to), which will serve as an excellent

basis for the nomenclature of British species. A catalogue is also in print containing the names of all the parasitic hymenoptera pertaining to the British Museum. The best work undoubtedly offered to the public is Dr. Snellen van Vollenhoven's "*Pinacographia*," containing over 1000 figures, all remarkably well executed, and in cases where insects are shown magnified, dimension lines are given alongside. The main points of construction delineating specific differences are also particularised where needful. Altogether, as a first-class work on an immature subject it cannot be too strongly recommended. An English translation is rendered with the Dutch. In the introduction to the book the author says:—"The text is a matter of secondary importance, and will only contain the explanation of the plates, diagnoses, and short descriptions of new species, with analytical tables and some remarks on biology. Meanwhile it may be possible that the drawing of such a number of figures will procure me so much knowledge of the different genera, that I may be induced at the end of this work to give a general systematic review of the families examined." Until the appearance of this book doubtless the illustrations of works of a similar character were radically bad (I mean with respect to diagrams), and more especially to early students of the order this fact appeared as an insuperable barrier to progression. Figures of hymenoptera are more valuable than descriptions, and consequently we must hail "*Pinacographia*" as a changing-point of the defection. Most works on ichneumons are foreign, and lie interspersed amongst other groups. The monographs by Holmgren (which can be purchased at a fair price) are notorious, and foremost in the literature of parasitic hymenoptera is Gravenhorst's "*Ichneumonologia Europæa*," from which indirectly emanated the publications of Ratzeburg and Desvignes. Various works and scattered fragments are also to be met with, by Forster, Wesmael, Curtis, Marshall, and others, and chance articles in the British magazines. M. Ed. André, member of the French Entomological Society, has forwarded to me a prospectus of a work he is publishing, entitled "*Species des Hyménoptères d'Europe*." I believe he intends to commence his work with the *Tenthredinidæ*, taking up afterwards *Ichneumonidæ* and *Braconidæ*; and if the book treats upon one-half of that which is specified in the prospectus, it promises to be an excellent undertaking. And lastly, for Yorkshire hymenopterists we have Mr. Roebuck's inaugural paper in the Transactions of the Yorkshire Union; but he shames Yorkshire collectors by being only able to give a list of known county insects numbering 50 or 60 species. It is but a sorry compliment to

our "big" county. We have unlimited scope, with only limited interest—"the harvest is plenteous, but the labourers are few." During the year 1878 I have many new county insects to report, of which I have made a careful list, but I shall be obliged to refrain from giving it here, as it is already sent to the "Transactions."

Now, I should leave a cloud on the horizon of my conscience if this paper were to be closed without my giving a dig in the ribs of (what shall I call them?) those stingy, meaningless individuals who pertinaciously and miserly stick to odd specimens which they come across, without knowing or seeking to know their names. They are of no earthly use to them unless as a study, but the insect is appropriated and the study ignored. Let them rather send them to some person who collects the order, or send them for purposes of identification and record. Or, again, if they go upon the "penny saved, penny gained," or "thing of beauty" principle, and don't like to part with the insect, I would ask them to obtain a name for it, and duly record it in some such medium as our own *Naturalist*. For my own part I shall be most happy to send back all specimens forwarded to me, and have to thank most sincerely Messrs. Porritt, Roebuck, Mosley, Carter, Smethurst and others, for their great kindness in this respect.

In conclusion, I would remind such (un)naturalists as those I have alluded to, that upon the back of one of our scientific magazines there exists a couple of lines which it would be well if they learnt off by heart, viz :—

"By mutual confidence and mutual aid,
Great deeds are done, and great discoveries made."

Woodland Mount, Huddersfield.

ON PARASITIC DIPTERA.

BY R. H. MEADE.

THE flies which live in the larval state within the bodies of the larvæ of other insects which they eat and slowly destroy are very little known even by dipterists. They are very numerous in species, but few individually, and are therefore not very frequently seen. They are mostly found upon flowers, for though so destructive to other insects while larvæ, they are perfectly harmless in the imago state; their mouths then being only adapted for sipping sweets. In their turn, however, they now sometimes get killed by other flies: for instance, I once captured a specimen of *Asilus* (a highly voracious fly) which had a female *Trixa œstroides* in its clutches.

The *Tachiniidæ*, as the family is called, are very difficult to name and describe, individuals of the same species varying greatly in size and even structure, and distinct species being very closely related to each other; so it is only by the examination and comparison of numerous specimens that it is possible to acquire a critical knowledge of them. There are many points of great interest respecting their natural history, one of the greatest being whether the same species of fly generally or always selects the same species of larva, or whether different species attack the larva of the same insect. Systematic authors give but little information upon this subject, though a few desultory facts have been recorded; thus it is quite unknown upon what caterpillar the larva of our largest species (*Echinomyia grossa*) feeds. In this (dipterology) as in other branches of entomology, the determination and arrangement of species possess much more attraction than the higher and more philosophical part of the science, viz., the study of the habits and manners of insects. We really know very little more now respecting the economy of the parasitic diptera than what was recorded long ago by those giants in entomology—De Geer and Rêaumur.

Being interested in the study of *Tachiniidæ*, I am induced to make these few remarks in the hope that some of the numerous lepidopterists who are readers of this journal may be led to assist me by carefully preserving all diptera (I do not want hymenopterous parasites, though they are equally interesting) which may issue from the cocoons of butterflies or moths in their breeding cages, taking note of the species from the cocoon of which they are bred. I will gladly undertake to name (as far as I can) any of the flies sent to me, and in this way some definite knowledge of their economy may be in time obtained.

About two years ago, Mr. Mosley, of Huddersfield, kindly sent me two or three specimens of *Exorista vulgaris*, which he had bred from *Thecla quercus*, and last year Mr. B. Cooke, of Southport (late of Bowden), gave me one of *Nemorea maculosa*, which issued from the cocoon of *Botys verticalis*. I have received a great many species from other entomologists, but, with the above exceptions, without any notice of the insect upon which they were parasitic.

To give some idea of the extent of this family, I may mention in conclusion that Meigen describes 315 European species in his great work on diptera, and F. Walker, 166 British ones in the second vol. of the "Insecta Britannica," and says he only includes half of them.

Bradford, Feb. 25th, 1879.

Rainfall for April.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·89	17	7·97	* 10·14	23	0·52
LEEDS ... (H. Crowther) ...	183	2·75	18	8·30	...	22	1·01
HALIFAX... (F. G. S. Rawson)	360	3·20	17	11·99	12·53	...	...
BARNSEY ... (T. Lister) ...	350	3·45	14	8·15	5·60	23	0·67
INGBIRCHWORTH (do.)	853	3·49	21	9·91	8·72	23	0·60
WENTWORTH CASTLE (do.)...	520	3·67	19	8·82	5·47	9	0·81
GOOLE ... (H. F. Parsons)	25	1·30	14	5·74	3·73	8	0·32

* This is the average to date for 13 years, 1866-78.

Short Notes and Queries.

Ditrichum (Trichostomum) subulatum, BRUCH.—Mr. E. M. Holmes, F.L.S., having been good enough to send me specimens in fruit of this rare moss from a new locality, perhaps a few remarks upon it may not be uninteresting. The (English) history of this moss is as follows :—It was first discovered many years ago by the Rev. Mr. Tozer, at Trethowell, near Truro, in W. Cornwall, and, according to Wilson, a specimen was sent to Prof. W. Arnott, named “*Didymodon pusillum operculo rostrato*.” At the time when Wilson’s “*Bryologia*” was published, this was the only British locality and specimen. More recently it was found by Mr. Holmes sparingly at Bickley Vale, in S. Devon, but not at the time recognised, owing to the capsules being old and without lid. The third find was at Saltash, in E. Cornwall, by Mr. F. Brent, of Plymouth, and on specimens being sent to Mr. Holmes, he at once recognised it, the plants being in good condition. Again it was found by Mr. R. V. Tellam, at Sunny Corner, near Truro, in 1871 : possibly, but not certainly, the original locality of Mr. Tozer. And lastly, Mr. Holmes has found it in fruit, at Easter in the present year, at Tamerton Ffolliott, in S. Devon, about four miles from the Cornish locality at Saltash : Bickley Vale is about eight miles further east. There are thus two Cornish and two Devon localities. It seems at present to be confined in Britain entirely to Watson’s first province, Peninsula, sub-provinces 1 and 2 S. peninsula, and Mid-peninsula, and its comital distribution is 1, 2, 3, W. Cornwall, E. Cornwall, and S. Devon. It differs from *D. homomallum* (some of the smaller forms of which it resembles), in its time of fruiting—March and April—the latter ripening its capsules in the autumn ; in its shorter seta and shorter oval capsules, not ovate-oblong or elliptical, and in its obliquely rostellate, not short and conical lid, and also by its *old* capsules being usually a little bent to one side, and in its monoicous inflorescence. It always grows in shady hollows, in hedgebanks, lanes, &c., on yellowish

clay-slate which is undergoing disintegration and forming detritus, and is therefore liable to fall away *en masse*, and thus disappear for some years. For much of the above information I am indebted to Mr. Holmes. This is the *Trichostomum subulatum* of Bruch and Schimper, Bryol. Eur. II., t. 182; Wilson's Bryol. Brit., p. 117, t. 42; *Didymodon aureus*, De Not. Spicileg. and Syll.; *Leptotrichum subulatum*, Hampe, C. Müller, Syn. I., p. 448; *Didymodon subulatus*, Bruch in De Not. Syll. Musc., p. 199. Out of England this moss has been found in Sardinia, Corsica, and Sicily; in France, at Cannes and the islands of Hyeres on the Mediterranean coast, and at St. Sever, in the Department of Landes, bordering the Bay of Biscay, and in the littoral region of North Africa, by Salzmann.—C. P. HOBKIRK.

CONCHOLOGICAL NOTES.—*Zonites glaber*, Studer.—On the 26th April last I took this species of land mollusc at Roundhay. This is the nearest locality to Leeds in which it has yet been taken. Shadwell ranks next, it having been collected there two years ago by Mr. Crowther.—*Clausilia laminata*, var. *albida*.—Early in May I took this variety of *C. laminata*, in company with *C. laminata* itself, *C. rugosa*, and *C. rugosa*, var. *tumidula*, near Leeds. *H. hispida*, var. *albida*.—This shell is occurring pretty abundantly again this year in the Leeds district, it having been taken in several places by myself and Mr. H. Crowther.—H. POLLARD, The Museum, Leeds.

NOTICES OF BOOKS, &c.—“The Great Atlas Moth of Asia, *Attacus atlas*, Linn., by P. H. Gosse, F.R.S., &c. London: West Newman & Co. (Coloured Plate).” Anything from the pen of Mr. Gosse is certain to be not only interesting and readable, but full of useful information. This little work is no exception, either in style or matter; it details the author's experiments in attempting to breed this “vastest of all known lepidoptera” from the cocoons sent over at various times from the East Indies. Mr. Gosse gives the whole life-history of this giant from the egg to the perfect imago, chiefly from his own experiments and observations, and carries the reader with him in such a captivating manner as to make him wish he had been the companion of his labours. We have read the whole with much profit, and the best recommendation we can give of it, is—to all our friends, whether general entomologists or those specially interested in the introduction of silk-producing moths—go and do likewise.

“Nature cared for and uncared for, by H. Bendelack Hewitson, M.R.C.S. London: West Newman & Co. (Woodcuts).”—This is the matter of a lecture delivered at the Mission Room at Walton, and treats of the habits and customs of three birds—the golden eagle, the hedge-sparrow, and the swallow—a subject which naturally suggests itself for a lecture given almost within the shadow of the well-known home of the great Yorkshire naturalist, Chas. Waterton, whose care for all birds has almost become a proverb. Its style is simple and colloquial, and will no

doubt commend itself to all young naturalists, for whose instruction and benefit it was chiefly read and published.

Obituary.—We regret to have to record the death of the well-known Yorkshire botanist, Mr. William Mudd, who has long been a labourer of no mean attainments among the cryptogams.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meetings April 29th and May 13th, Mr. T. Lister presiding.—This is usually a period of great interest in marking the arrivals of spring migrants, but owing to the severe season they are late in making their appearance, with a few exceptions. Mr. W. Talbot of Wakefield reports the wheatear our first spring visitor, March 22, and three sand martins on the Calder April 5; also the yellow or Ray's wagtail, all from five to eight days before their average time. But the most exceptionally early was the wood warbler April 8th, due May 3 (not yet heard in our woods). Mr. S. Tomlinson, of New Park Spring, observed the chaffinch April 1, and Mr. Lister saw and heard it in Greenfoot-lane April 5; on same day Mr. J. Matthews of Clayton-west saw the wheatear. The cuckoo was seen by Mr. Senior, Tyer's-hill, April 7, and by the president in same neighbourhood on Good Friday, and three willow warblers same time. None of the above birds sang, owing to the cold. The first song of the cuckoo was reported April 17th at Rockley. The swallow was seen by Mr. Barker near Old Mill, April 17th, by Mr. W. Carrington April 19th, by Mr. Lister and others on several succeeding days; the house martin seen by Mr. Alderson at Switheren April 21; the whinchat seen in Cliff Wood same date. It was seen by Mr. Tomlinson April 17; he records the tree pipit April 21, the grasshopper warbler 22nd, the black-cap warbler 23rd, the redstart 25th April. Mr. H. Garland of Wood Hall saw the swallow April 17th, and the whitethroat April 22nd. Mr. J. Smith reported Ray's wagtail April 8th, and the tree pipit April 15th; the lesser whitethroat was seen April 28th; Mr. E. Watson of Darfield saw the grey flycatcher in his garden April 23; he also saw the snow-bunting (a winter visitant not yet gone to the north). He also recorded the sandpiper April 25. The most choice records are two pairs of pied flycatchers seen by Mr. H. Teasdale on the 2nd and 3rd May, near Clarke's colliery, a new locality. Wentworth Castle, and sometimes Cannon Hall have been frequented by this beautiful bird. Last and best, the nightingale was reported May 1st; Mr. Lister had the pleasure of hearing it on the 3rd, though a cold day. Several flowers were laid on the table and examined, and the dates given.

BRADFORD NATURALISTS' SOCIETY.—Meeting April 16th, Mr. Firth in the chair.—Mr. Brook read a paper on "The cultivation of Ferns." The lecturer gave the composition of the necessary soil, and thoroughly explained the treatment essential to success, especially in raising them from spores, various young ferns being shown in the pots just as they

had been raised from the spores. Many plants and insects were placed on the table for examination.

MEETING April 29th, Mr. Jagger in the chair.—The president gave an excellent lecture on “The action of Water,” treating especially on the rainfall of various countries, and its ultimate effect on the distribution of organisms.

MEETING May 13th, Mr. Illingworth in the chair.—Mr. J. Hebblethwaite read a paper on “Window-gardening,” showing how he succeeded in raising the choicest flowers in-doors, notwithstanding the proverbial smoke and gas. The chairman showed larvæ of *C. dominula* from Kent; Mr. Carter, *T. opima* (bred) and *B. hirtaria* (bred); Mr. Butterfield sent for exhibition a beautiful variety of *L. multistrigaria*.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, 5th May, Mr. W. Robertshaw in the chair.—Owing to the lateness of the season botany was poorly represented. The ornithological section gave the arrival of the summer migrants as follows:—Wheatear, March 23rd; Swallow and cuckoo, April 14th; willow wren, 21st; sand martin, 25th; Ray's wagtail, house martin and tree pipit, 27th; redstart, 30th; sedge warbler, grasshopper warbler and chiffchaff, May 4th; whinchat, 6th. Mr. C. C. Hanson read a paper on “Structural Botany,” with illustrations on the black-board.—W. H. STOTT.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting May 9th, Mr. S. L. Mosley, V.P., in the chair.—Mr. C. P. Hobkirk exhibited the following mosses:—*Barbula tortuosa*, *B. fallax* (fr.), *Hypnum filicinum*, *Anomodon viticulosus*, *Ditrichum flexicaule*, and its var. *densum*, all from Malham; *Pottia Heimii* (fr.), and *Tetraphis pellucida* (fr.), from near Hastings, received from the Rev. E. N. Bloomfield; a series of *D. flexicaule*, var. *densum*, sent by the Rev. J. Fergusson, from the following different localities:—Ben Lawers, Clova, Braemar, Brechin, and Cape Cater in the Arctic regions; also *Pottia truncata*, from Kirkheaton, Huddersfield, and new to the district. Entomology: Mr. G. T. Porritt exhibited the following Crambites:—*Crambus alpinellus* and *C. adipellus*, *Homæosoma senicionis*, *Ephestia figulilella*, and *Gymnancycla canella*. Mr. S. D. Bairstow, living larvæ of *Lithosia camplanula*, found on rocks at Llanrwst. Mr. George Brook, ter., a living larva of *Cossus ligniperda*, from Alderley Edge. Ornithology: Mr. James Varley showed the gizzard of a ptarmigan which was filled with catkins, apparently of birch. He also reported the arrival of spring migrants as follows:—Willow warbler April 15th, at Mirfield; chiffchaff and sand martin April 15th, wheatear April 16th, swallow April 19th, at Wakefield; cuckoo April 29th, and martin April 30th, at Huddersfield. It was remarked that these dates were unusually late, doubtless owing to the severe spring weather. The secretary (Mr. George Brook, ter.) then read an interesting and valuable paper, entitled “Notes on *Colembola* and *Thysanura*.” He illustrated it with living specimens of *Campodea staphylinus* found in the district, and with mounted specimens of many other species.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting, April 27th, Mr. S. J. Capper, president, in the chair. A paper was read by Mr. W. H. Heyworth, of Alderley-edge, on "The Lepidoptera of Mid-Cheshire." A communication was also read, supplied through the kindness of Mr. T. J. Moore, from Mr. Dunkinfield Jones, of Woolton, who is at present studying the lepidoptera of Brazil, in which Mr. Jones gives some interesting details respecting the miniature stages of several species of the genera *Morpho* and *Papilio*, with special reference to the venomous nature of certain larvæ of that district. The chairman then drew the attention of the meeting to the efforts now being made by Miss E. A. Ormerod, Isleworth, and Mr. E. A. Fitch, Maldon, with other gentlemen, to interest entomologists generally in observing and recording the appearance and economy of certain insects annually selected, which were specially injurious to crops. In presenting the report of last year's observations to the meeting, the chairman impressed on the members the advisability of aiding, as far as was in their power, these efforts. The insects selected for observation during the present year were sixteen in number, and Miss Ormerod would be glad to furnish any member or other gentleman interested in the subject, and willing to record his observations, with a printed form for that purpose. The usual conversazione terminated the meeting.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—329th meeting, April 15th, Mr. C. H. Bothamley in the chair, who showed some rock specimens from the Ingleton district.

330TH MEETING, April 22nd, Mr. Charles Rider in the chair.—Mr. W. H. Hay exhibited the eggs of the chipping sparrow (*Fringilla socialis*) and the song sparrow (*F. melodiæ*) from Cookstown, Ontario, Canada. He described the birds, and made some remarks on their nidification. Mr. H. Marsh showed specimens of *Anisopteryx æscularia* from near Arthington, where it was very abundant on the 19th April. Many microscopic objects were shown by Messrs. W. Barwell Turner, F.C.S., F. Emsley, &c., including *Ceramium rubrum* from Hornsea, and a curious water animal from Adel, concerning which there was an interesting discussion.

331ST MEETING, April 29th, Mr. Edward Atkinson, F.L.S., F.Z.S., president, in the chair.—Several donations from Dr. Wesley, of Wetherby, were announced, and a vote of thanks passed. Mr. W. Raine reported having seen the swallow at Roundhay Park, on the 26th April, and Messrs. Hay and Grassham for the same date at Beamsley Beacon, in Wharfedale. Mr. W. B. Turner showed spicules of sponges (*Grantia*, *Halichondria*, *Tethya*, and *Hyalonema*) and sections of spines of echinidæ. Mr. C. H. Bothamley then assumed the chair, and the president read a paper on "Copal, and the allied fossil and sub-fossil Gum-resins: their origin, natural history, and uses in the arts and manufactures," illustrated by a beautiful series of specimens of native gums.

332ND MEETING, May 6th, Mr John Grassham in the chair.—Mr. Abbott mentioned the discovery of *Gagea lutea* at Collingham and Masham by a boy of 12, son of Mr. Houlton, of Wetherby. Mr. Abbott stated that he had gathered it abundantly near Doncaster. Mr. Smethurst showed Meanwood larvæ of *Noctua brunnea* and *Mania typica*. Mr. Roebuck, *Trichiosoma betuleti*, also its empty pupa-case, sent from Storthes Hall Wood, Huddersfield, by Mr. S. L. Moseley. Mr. James Abbott, stained sections of brain of *Blatta*, showing the attachments of the nerves, and their relations to the eyes, œsophagus, &c. ; also eye of *Carabus*, showing multiplication of images through the facets. He brought his new Ross-Zentmayer microscope stand ; also Swift's new portable miniature microscopic lamp.

333RD MEETING, May 13th, Mr. C. H. Bothamley, v.p., in the chair, who read a paper on the "Radiometer." Mr. Roebuck showed *Arvicola agrestis* from Pannal. Mr. Walter Raine, a large number of rare British birds' eggs, including the extinct great bustard ; also the various doves, including passenger pigeon, the Barbary partridge, &c. Mr. H. Marsh, Pateley Bridge, egg of the ring ouzel. Mr. James Fogg, *Tæniocampa gothica*, var. *gothicina* from Ackworth, and Mr. Smethurst, a long series of the variations of *T. instabilis*. Mr. Roebuck, on behalf of Mr. T. Lister, a specimen of *Acanthocinrus ædilis*, taken in a colliery near Barnsley, probably imported with Scandinavian timber. Mr. Alfred Denny, *Tapinostola bondii* and *Procris globulariæ* from Folkstone ; *Thais polyxena* from South of France, with its pupa-case and ophionid parasite (*Metopius dentatus*), bred, from Caithness ; examples of *Bombyx callunæ* ; and some beetles taken near Adel, including *Rhagium inquisitor*, *R. bifasciatum*, *Pyrochroa rubens*, and male and female *Meloë violaceus*. The microscopic exhibits were numerous and interesting. Mr. W. Barwell Turner, F.C.S., reported that among other fresh-water algæ collected in the Seven-Arches Valley, Meanwood, were identified *Mesocarpus scalaris*, *Coleochaete scutata*, *Bulbochaete setigera*, *Draparnaldia plumosa*, *Spirogyra communis*, *S. quinina*, *Tetmemorus granulatus*, and seven species of *Closterium*. At the same place (and also on May 3rd) Mr. Turner made a collection of diatomaceous material, which has already yielded thirty-three species and one variety. The general results of this gathering are verified by examination of a like gathering made on the 11th, in the Meanwood Valley, by Mr. F. Emsley. Mr. W. H. Kirtlan showed living examples of *Draparnaldia glomerata*, *Lyngbya* (? sp.), *Oscillatoria nigra*, *Closterium moniliferum*, and diatoms.—W. D. R.

YORKSHIRE NATURALISTS' UNION.—The second meeting for 1879 was held at Harrogate on Saturday, the 10th of May. The ornithologists turned up in strongest force, the Pateley Bridge district being, from its varied character, specially attractive to them. The main body of excursionists visited Pateley, and only a very few investigated the immediate neighbourhood of Harrogate. The meeting at the People's Hotel, Albert

Street, was presided over by the Rev. Wm. Fowler, M.A., of Liversedge. Fifteen Societies were represented. The list of new subscribers included Messrs. S. Mitchell, of Clitheroe, T. J. Foggitt, of Thirsk, John Emmett, of Boston Spa, Charles Foster and H. Ingram, of Leeds. Votes of thanks were passed—to Mr. Thomas Hick, B.A., B.Sc., of Harrogate, the local secretary; to Mr. John Yorke, of Pateley, for permission to visit his grounds at Ravensgill and Guyscliffe; to Capt. Williams, for accompanying a party down the lead mines at Greenhow Hill; and to Mr. Thomas Thorpe, of Pateley, for his willing co-operation in general. The reports of sections being called for, on behalf of the Conchological Section, Mr. John Emmett reported that only two shells had been found. Messrs. S. D. Bairstow and G. T. Porritt reported on behalf of the Entomological Section:—In consequence of the cold frosty weather no lepidoptera had been noticed, and only a few species of coleoptera, hymenoptera, and neuroptera. In the Botanical Section Dr. Parsons reported as follows:—The localities explored during the day were Harrogate, Knaresborough, Pateley Bridge, Ravensgill, Greenhow, Markington, Brimham Rocks, &c. Owing to the extreme backwardness of the season, comparatively few flowering plants were seen. The Vasculares observed were 142, including *Helleborus viridis* (apparently native near Knaresborough,) *Stellaria nemorum*, Pateley Bridge, *Alsine verna* and *Saxifraga hypnoides*, Greenhow; *Chrysosplenium alternifolium* and *Lactua muralis*, Pateley Bridge; *Vaccinium Vitis-Idæa* and *V. oxycoccos*, Brimham rocks, *Polypodium Dryopteris*, P. *Phegopteris*, *Hymenophyllum unilaterale*, and *Lycopodium Selago*, Pateley Bridge. Mosses, 80, including *Weissia cirrhata*, *Dicranum majus* (fr.) *Eucladium verticillatum* (fr.), *Racomitrium* four species, *Ulotia intermedia* (fr.), *Bartramia pomiformis*, *Physcomitrium pyriforme*, *Bryum pallens* (fr.), *Mnium serratum* and *M. stellare*, *Hookeria lucens* (fr.), *Anomodon viticulosus*, *Plagiothecium undulatum* (fr.), *P. elegans* (? *P. Borrerianum*), *Hypnum uncinatum* (young fr.), *H. stellare*, *Hylocomium brevirostre*, and *H. loreum*. The Hepaticæ, 12, included *Scapania undulata* (fr.) and *S. nemorosa*: *Plagiochila asplenioides*, *Jungermannia albicans* (fr.), *J. inflata*, and *J. barbata*; *Calypogeia Trichomanes*, and *Lepidozia reptans*. The Lichens, 20, were mostly the ordinary species, with the exception of *Lecidea geographica* on gritstone at Markington—a somewhat unusual habitat. Among Algæ *Lemania fluviatilis*, and among Fungi *Agaricus umbelliferus*, *Rhytisinia acerinum*, and *Stegia ilicis* were observed. A list of fresh-water algæ observed in the neighbourhood of Markington by the Rev. J. S. Tute, was handed in to the Section. It contained 50 species. Mr. J. Spencer, of Halifax, gave the report of the Geological Section, which had not been very successful in a Palæontological point of view, but otherwise the geology of the district was deeply interesting. They had gone over the four geological formations, viz.,—the mountain limestone, the lead mines of Pateley Bridge, the permian, mill-stone grit, and Yoredale rocks of the neighbourhood of Harrogate, Knaresbro',

and Pannal. The old castle of Knaresbro' stood upon the permian formation, which lies unconformably upon a bed of massive but rather soft dark red rock, of a gritty nature, but whether it belonged to the millstone grit or not he could not say, from so brief an examination. Following the line of the permian escarpment along the banks of the river Nidd, Grimbald's Crag was reached, which consists of a great mass of magnesian limestone, resting unconformably upon a bed of pebbly grit belonging unmistakably to the millstone grit series. Between the permian and the millstone grit the great coal formation generally lies, but in the neighbourhood of Harrogate that formation is entirely absent. It was the generally received opinion that the coal formation of Yorkshire was once continuous with that of Durham and Northumberland, as undoubtedly it was with that of Lancashire. If such was the case, there must have been a great interval of time between the deposition of the coal-measures and the formation of the permian rocks, during which mighty disturbances took place, and the coal formation was swept off the grit rocks from Yorkshire to Durham. The evidences of these disturbances abound in this neighbourhood. The Yoredale rocks, for instance, which occupy a space about two miles broad by four miles long, stretching south-west from Harrogate to Pannal, were quite out of place. They had been subjected to enormous pressure, folded and contorted in all manner of ways, and thrust up between the grit rocks to a level with them. At Beckwith quarry, near Beckwith House, the effects of the upheaving and disturbing forces could be plainly seen, for the rocks were folded and contorted into a series of anticlinal and synclinal curves and broken up into fragments. The spa wells of Low Harrogate most probably owe their existence to the same causes. The Yoredale rocks abound in fossiliferous beds, and wherever these crop out at the surface in low ground, and water oozes from them, the decomposition of the fossils gives rise to sulphurous and other mineral springs. The great number of mineral springs which occur in the Bog Fields is evidently due to the peculiarly folded nature of the rocks there. The rainwater sinking into the upturned edges of those folds, and percolating through the fossiliferous beds, which contain a large amount of sulphur and other minerals, oozes out in the Bog Fields as mineral springs. In the Vertebrate Section Mr. Lister reported as follows:—In a quick walk from Pannal to Harrogate, fourteen resident and four migratory birds were noticed. Of these, four were not noted in the longer excursion to Pateley and the moors around, viz., magpie, jackdaw, lesser redpole, and swallow. Of resident birds at Pateley Nidderdale, 31 were observed, the most important being the sparrow hawk, merlin, carrion crow, grey wagtail, curlew, stonechat (a partial migrant), golden plover, red grouse, lapwing, snipe, and mountain linnet. Of spring migrants seven were noticed—the whinchat, willow warbler, redstart, blackcap, tree pipit, sand martin, and ring ousel; of other animals—the viper, short-tailed field vole, and long-eared bat.—W. D. R.

Diary.—Meetings of Societies.

- June 2. Yorkshire Naturalists' Union—Excursion to York, for Askham Bog. Tea at 4; Sections, 5; General Meeting, 6 p.m., at Victoria Hall, Goodramgate, York (Rooms Nos. 1 and 2). Local Secretary, W. Prest, 13, Holgate Road, York.
- „ 3. Bishop Auckland Naturalists'. Liversedge Naturalists'. Leeds Naturalists' Club and Scientific Association.
- „ 4. Wakefield Naturalists'.
- „ 5. Leeds Conchological Society.
- „ 9. Manchester Cryptogamic Society.
- „ 10. Bradford Naturalists': Paper, "The Origin and Purposes of the Society."—J. W. Carter. Leeds Naturalists' Club and Scientific Association.
- „ 11. York and District Naturalists' Field Club.
- „ 13. Huddersfield Scientific Club.
- „ 17. Leeds Naturalists' Club and Scientific Association.
- „ 20. North Staffordshire Naturalists' Field Club:—Excursion to Gun and Meerbrook—Leader, Mr. Brough.
- „ 24. Bradford Naturalists': "The Sun."—Mr. C. C. Starling. Leeds Naturalists' Club and Scientific Association.
- „ 30. Lancashire and Cheshire Entomological Society.
-

AT a Meeting of the VERTEBRATE SECTION of the YORKSHIRE NATURALISTS' UNION, held at Ingleton on the 14th of April, it was resolved to publish as the commencement of series B of the "Transactions" of the Union a **LIST OF THE BIRDS OF YORKSHIRE**, to include all recorded occurrences of the rarer species as far as is practicable. Its compilation was placed in my hands. I now appeal to all our ornithologists to give me their best assistance in the work by sending at once from all parts of the county **LISTS**, with remarks as to the distribution, abundance, breeding, and rare occurrences of the **ACCIPITRES** (Eagles, Hawks, and Owls) only, as the work will have to be done gradually. When the list of this group is completed, it is contemplated to apply for information on the next succeeding group. All assistance will be duly acknowledged.

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No. XLVIII.

JULY, 1879.

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Original Articles.

YORKSHIRE ORNITHOLOGICAL NOTES FOR 1878.

WM. EAGLE CLARKE.

BLACKBIRD, March 10th.—At Blackhill I observed an exceedingly beautiful pied specimen of this species, the shoulders and back of the neck being liberally dashed with pure white.

DIPPER, April 16th.—My friend Mr. Harrison found a nest containing four young birds—an early date for young ones.

SWALLOW, April 21st.—I observed this species for the first time this season.

SANDPIPER, April 22nd.—This migrant had arrived on the Nidd.

STOCKDOVE, April 22nd.—I found a nest, with two eggs slightly incubated, in a hollow tree at Wilstrop.

REDSHANK and **SNIFE**, April 27th.—These species breeding on Stren-sall Common, where I obtained their eggs.

GRASSHOPPER WARBLER, April 27th.—I observed this species on Strensall Common, where I have no doubt it breeds.

TEAL, April 28th.—A family party, consisting of a parent bird and nine young ones, on one of the lagoons on Strensall Common. On observing us the old bird conducted the young to a small rushy island, and then took flight. Wishing to examine the young, three of us waded to the island, thinking we should have no difficulty in finding them, as the island was very small, and was situate in the centre of the lagoon; but although we searched it thoroughly our efforts were all in vain. Where they got to we could never tell.

CUCKOO, April 28th.—One heard at Crossgates.

GOLDEN PLOVER and **CURLEW**, May 4th.—Four nests of each of these species, containing 30 eggs, were found by my friends and myself on the moors above Ilkley.

GRASSHOPPER WARBLER and **WREN**, May 4th.—I observed both these species quite on the moors—rather an unusual locality.

RING-OUZEL, May 4th.—A nest ready for eggs among the heather on the moors above Ilkley. This nest a week afterwards contained five eggs.

SWIFT, May 6th.—At Kirkstall.

SPOTTED FLYCATCHER, GARDEN WARBLER, WHITETHROAT, and REED BUNTING, May 26th.—All nesting at Bishop's Wood.

RUFF or REEVE, August 30th.—An immature specimen shot at Kilnsea, now in my collection.

TURNSTONE, Sept. 1st.—Some thousands of these birds on the shore near Spurn. Judging from their great tameness they had arrived during the night, and were tired; they would allow me to approach within ten yards, and I was much interested in watching them turn over the *debris* at high-water mark, in search of sandhoppers; &c. Many of the birds were still in their beautiful summer dress, but the greater number were birds of the year.—Sept. 2nd, the turnstones have split up into small parties, consisting of five or six birds, and are very difficult to approach.

WOOD SANDPIPER, Sept. 2nd.—It affords me great pleasure to place on record the occurrence of this uncommon bird in Yorkshire. My friend Mr. Hewetson shot one, in my presence, as it was feeding on a drain side, near the village of Kilnsea. This bird is now in my collection.

SANDERLING, Sept. 2nd.—This species in its beautiful mottled plumage above, and silvery white beneath, was pretty numerous. I obtained a few fine specimens.

KNOT, Sept. 2nd.—A few immature specimens of this species with the buff breast observed. The main body has not yet arrived from the far north.

OYSTERCATCHER, Sept. 2nd.—A family of four at Spurn. They have evidently nested in the neighbouring sandhills.

LESSER TERN, Sept. 2nd.—A few of this summer visitant to our coasts seen. The main body has already departed south.

REDSHANK, DUNLIN, RINGED PLOVER, and CURLEW, Sept. 1st to 7th. Numerous on the Humber muds.

GREAT BLACKBACK, LESSER BLACKBACK, HERRING and BLACKHEADED GULLS; KITTIWAKE and COMMON TERN, September 1st to 7th.—Observed on the coast.

CURLEW SANDPIPER, Sept. 7th.—I obtained a fine specimen out of a small party of dunlins, in whose company it was feeding at low-water mark, at Kilnsea. It was an immature bird, and in this plumage difficult to distinguish from the dunlin; but it may be known by its long curved bill, white tail coverts, and buff breast.

BARTAILED GODWIT, Sept. 26th.—Two shot on the Humber and forwarded to me.

GOATSUCKER, Oct. 23rd.—A fine female shot at Easington, where it frequented the gardens for some days. On being opened, its stomach was found to be filled with small *Coleoptera*. This is a late date for this species to remain with us.

GODWIT, Oct 26th.—I observed a godwit feeding on the Humber muds. From its size I think it must have been a “bartail,” which is the commoner species on our coast.

REDWING, Oct. 26th.—This winter visitant numerous on Spurn; I was unable to ascertain the date of its arrival.

WREN, Oct. 26th.—Very numerous among the buckthorn on Spurn point.

GREAT TITMOUSE, Oct. 26th.—A pair of these birds trying to make themselves at home on some stunted railings at the village of Spurn, where there are no trees, and all is sand. They were evidently immigrants. This opinion is confirmed by Mr. Cordeaux’s excellent account of the “Autumn Migrations of 1878,” (*Zool.*, Feb., 1879.)

GREY PLOVER, Oct. 26th.—This northern species numerous, feeding singly on the muds.

SANDERLING, Oct. 28th.—Not so numerous as I found them in September. They have changed their mottled plumage, and put on a delicate grey above, the silvery white breast remaining unchanged. This is their winter plumage.

KNOT, Oct. 28th.—Flocks containing some thousands seen at high water. As the tide recedes they spread themselves over the miles of mud. This species has now assumed its grey and white winter plumage.

SWALLOW and MARTIN, Oct. 28th.—I saw a few of each of these species on the wing at Spurn—a late date.

FIELDFARE, Oct. 28th.—This species arriving incessantly in parties of from thirty to fifty individuals, the whole day from the E.N.E. All seemed to be very tired, and to fly almost mechanically. They have had a rough passage, the wind blowing fresh from the N.W. On arriving at Spurn some of these parties went south, whilst others pursued an easterly course. This immigration commenced yesterday.

RING OUZEL, Oct. 28th.—I observed two birds of this species flying in from the sea.

BLACKBIRD, Oct. 28th.—Numbers of this species arriving at Spurn.

GREY CROW and JACKDAW.—Arriving in parties from N.E. A grey crow attempted to carry off a sanderling I had shot, as it lay in the water, although I was within about thirty yards of it.

SISKIN, Oct. 29th.—I watched for some time, at a distance of only a few feet, a party of five of this species ; they were feeding on some low seed-bearing herbs on the roadside at Easington. In their movements they reminded me much of our familiar lesser redpoll.

PURPLE SANDPIPER, Oct. 29th.—I obtained a pair of these birds (male and female) out of a party of three, as they were feeding at high-water mark on the beach. They were in full winter plumage, which is the most handsome in this species.

WHEATEAR, Oct. 29th.—I shot a wheatear having a deformed bill ; the lower mandible being bent down at an angle, allowed the upper one to meet it only at the base. In spite of this it was in good condition.

GOLDFINCH, Dec. 26th.—A small flock in some market gardens in the Meanwood-road, Leeds. This is the first instance that I have heard of this species being seen near Leeds ; it is uncommon in the county.

BLACKBIRD, THRUSH, and REDWING, December.—These species perished in thousands during the severe weather. The Spurn postman informs me that about Christmas was the most deadly period. He saw hundreds of dead blackbirds, thrushes, and redwings, but most of the latter species. But it is indeed “an ill wind that blows no one any good,” for the grey crows were in clover, and, to use the expression of my informant, “grew as fat as butter” on the starved, weak birds.

5, East View, Leeds,
April, 1879.

EXORISTA HORTULANA (MEIGEN) IN BRITAIN.

BY R. H. MEADE.

MR. PORRITT having very kindly given me a male specimen of this parasitic fly, which he bred from the larva of *Acronycta alni*, taken near Wakefield, I have been induced to write a short account of it, as the species has not been described by Walker in the *Insecta*

Britannica, nor (I believe) by any other British entomologist. The genus *Exorista* belonging to the family Muscidae and sub-family Tachiniidae, may be thus briefly characterised:—Eyes hairy; antennæ with the third joint more than twice the length of the second; style quite bare; oral vibrissæ not extending more than half way up the face; wings with the first posterior (or middle) cell open at its extremity, and terminating before the tip of the wing; abdomen oval, with the first ring short. *E. hortulana*.—Nigrocærulea; thorace lineis quatuor nigris; abdomine faciis albo-cinereis inequalibus; linea dorsali et ventro nigro; palpis testaceis; pedibus nigris. Long. 4 lin. Male, blue black. HEAD: frontal space about one-fourth of the width of the head; central stripe brown; lateral margins white with black grey reflexions, and ciliated with numerous small black hairs in addition to the row of bristles which extend down the face to a little below the end of the second joint of the antennæ; face oblique, silky white; antennæ with the first joint very short, the second somewhat elongated, the third stout and between two and three times as long as the second; style with both the nasal joints very short and indistinct, the third long, quite bare, and thickened for about half its length; two very large bristles (vibrissæ) are seated one on each corner of the apistome, above which a few small ones, gradually decreasing in size, extend up about one-third of the face; palpi yellow for about half their length, but black at the base. THORAX blue black, with grey reflexions on the anterior margin and shoulders; has four narrow longitudinal black stripes, the middle pair rather wide apart, and indistinct posteriorly. SCUTELLUM blue-black. ABDOMEN tessellated with black and white reflexions, arranged in irregular bands on the three posterior segments, and marked on the dorsum with a longitudinal black stripe, which is wider on the second segment; first segment short and quite black; second, with a very narrow interrupted white band on its anterior margin, and a large irregular white spot on each side; third and fourth segments with wide irregular transverse bands of whitish reflexions on their anterior parts, and with the posterior margins black; second segment with two large spines on the edge of the posterior margin, but with none on the disk; third and fourth segments with spines both on the margins and disk; belly black. LEGS black; posterior tibiæ ciliated along their outer sides with short bristles of even lengths, and having one long spine a little below the middle. WINGS hyaline; posterior transverse (discal) vein oblique and slightly sinuous; fourth longitudinal (præbrachial)

vein bent at an obtuse angle and slightly curved inwards in its course to the costa, which it reaches a little before the apex.—The female fly is undescribed.

Bradford, June 12th, 1879.

[The parasite described above I bred from one of the larvæ of *A. alni* sent to me from Wakefield by Mr. William Talbot, in Sept., 1877 (see *Naturalist* III., p. 40). One or two other specimens emerged from the same larva, which I gave to Mr. S. L. Mosley, so possibly there may be a female amongst them.—*G. T. P.*]

PERSISTENT VARIATION AMONG THE BRITISH SPECIES OF BUTTERFLIES.*

BY S. L. MOSLEY.

[Read before Members of the Huddersfield Scientific Club, 18th April, 1879.]

IN the following paper I have simply gathered together information which, so far as I am aware, has hitherto been scattered, at any rate so far as the British species is concerned. On the continent of Europe they pay a great deal more attention to persistent varieties than we do in England; perhaps they make rather too much of them sometimes by giving names to varieties of very trivial importance—scarcely distinguishable from their types. But on the other hand, British collectors are too prone to pass over well-marked and distinct forms as not being worth notice—at any rate, not worth having a name given to them, and hitherto their very isolated ideas have precluded them from naming varieties in common with the continental entomologists. What British lepidopterist, for instance, if asked if he took *Cænonympha Pamphilus*, var. *lyllus*, in his district, could give a satisfactory answer? Yet, I presume, few collectors have not taken this form of that very common insect, and numerous other similar instances might be named.

I think it well that we should know these well-marked and constant varieties by a name wherewith to distinguish them from their respective types, and I think it important that these variations should be better understood by British collectors. There is another variety of

* For much valuable assistance in the preparation of this paper I am indebted to Mr. J. E. Robson, of Hartlepool, who is preparing a catalogue of all persistent varieties found in Europe. Either Mr. Robson or myself would be glad of any information touching the occurrence and distribution of these varieties in Britain; also particulars of local forms, &c.

Pamphilus, a pale one, which has several times occurred in Yorkshire, and no doubt in other places also, which, so far as I am aware, is without a name, and we can only speak of it as "the pale form of *Pamphilus*." Numerous other instances occur in the British lepidoptera, and if these had occurred in botany, and especially in conchology, they would immediately have had names given to them so that they could easily be referred to,—in fact, the conchologists could not get on very well without these names, so striking and numerous are the variations in shells : look, for instance, at the common *Helix nemoralis*.

It might be objected that this naming of mere varieties has a tendency to cause confusion, as I have heard it asserted in regard to botany ; but I fail to see how any confusion can possibly arise where the name of the variety occurs only in conjunction with that of the type. I should therefore be careful not to give a name to any variety until it had been proved that it was a recurrent variety, either local or otherwise. Again, if nomenclators would pay more attention to giving characteristic and sensible names, instead of making so many "*Haworthi's*" and other fancy names, which to me convey no meaning, and give no scientific impression at all, the probabilities of confusion would be much lessened. I purpose, therefore, in the following paper to lay before you some of the constant or permanent varieties to which the British species of butterflies are subject, both here and on the continent of Europe, for no doubt many varieties which have hitherto been recorded only from the continent, would be of frequent occurrence here, if properly understood and looked for.

To the evolutionist these varieties may be of the utmost interest as pointing to races gone before, or as offering indications to him of the approach of new species. Are there not some occasions when we can call to our memory instances where the type has given place to the variety, and the variety in turn has become the type ? This change has, no doubt, operated in cases where we get local races of the same thing, such as *Lycaena Agestis*, &c. To some persons every family of insects seems to be but as varieties of the grand whole ; every genus but as varieties of the same family ; and every species as varieties of each other. In fact, there seems to be no limit to variation. Look, for instance, at the extent to which *Colias Edusa* can vary—a species which everybody, previous to the great *Edusa* year, supposed to have been tolerably constant. Insects of every species seem liable to vary more or less, and even in the same insect I have found that the two opposite sides often disagree in some particular. Take an insect and

examine it for yourselves,—say one of *Abraxas grossulariata* or *Che-
lonia caja*,—and you will frequently find that the pattern on one pair
of wings is not an exact repetition of that on the other pair. Again,
on the other hand, many which now rank as good and distinct species
might, if their natural history was properly understood, be sunk as
mere geographical or altitudinal varieties of the same thing. For
example, the genus *Colias*, and our own *Edusa*, has produced almost
unmistakable *Chrysothome*, Esp., and other specimens very nearly
approaching *Myrmidone*, Esp., *Erata*, Esp., and even *Aurorina*, H.S.
But I must end my introduction, and enter upon the description of
the several forms and varieties which it has been my good fortune to
have had under notice during my entomological career.

(To be continued.)

Rainfall for May.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·73	15	9·70	* 12·31	29	0·49
LEEDS ... (H. Crowther) ...	183	1·47	19	9·77	...	29	0·46
HALIFAX... (F. G. S. Rawson)	360	1·52	19	13·51	17·63	...	...
BARNLEY ... (T. Lister) ...	350	2·18	17	10·33	8·79	15	0·56
INGBIRCHWORTH (do.)	853	2·55	17	12·46	13·98	29	0·63
WENTWORTH CASTLE (do.)...	520	2·17	14	10·99	8·93	29	0·63
GOOLE ... (H. F. Parsons)	25	2·48	16	8·22	6·24	31	0·48

* This is the average to date for 13 years, 1866-78.

Short Notes and Queries.

Acherontia Atropos AT MARSDEN.—On Saturday, 14th inst., we were
shown a fine specimen of this species, taken on the moors recently by
Miss Hirst, of Blake Lee.—EDS. *Nat.*

REDSHANK AT GOOLE.—On the 13th inst., Mr. A. Kell, of Barnsley,
Mr. Richardson, of Goole, and myself were looking for nests and eggs on
the borders of Goole Moors, when we saw a redshank settle on a low tree,
evidently watching us, and ready to give warning to its mate. As we
approached we saw it leave the tree, fly round screaming, and again settle.
Can any of your correspondents say if it is usual for the redshank to

perch on a tree? We also found a cuckoo's egg in the nest of a greenfinch, built in a spruce fir 14ft. from the ground. A pair of cuckoos had been seen there on a previous occasion. We were surprised to find the egg in a nest so high from the ground.—THOMAS BUNKER, Goole, June 16th, 1879.

Anomolon septentrionale, Hlmgr.—I had the pleasure of exhibiting, at the Yorkshire Union Exhibition, held at Leeds, an ichneumon which is new to Britain. It is not included in Marshall's or the Brit. Mus. catalogue, nor have I observed a record of its occurrence in France. Dr. S. van Vollenhoven kindly named it for me. It is thus described in Holmgren's "Monograph of Anomolons":—" *Anomolon septentrionale*, Hlmgr.—Nigrum; ore, clypeo, orbitis et apice genarum, facie, macula ad orbitas verticis; et articulo primo antennarum subtus, flavidis; abdomine rufo, dorso apiceque late nigris; pedibus anterioribus fulvis, apice tarsorum in fuscato; posticis maxima ex parte nigro-piceis, tarsorum medio flavo; valvulis terebrae pallidis." "Fem. long. circiter 3 lin." Antennae with joint one yellow beneath. Thorax and legs with short hoary pile. Legs: first and second pair coxæ fulvous, segments, paler towards the tip, which is dusky. Hinder pair coxæ, blotched red, trochanters fulvous, femora and tibiæ rufous, apical segments darker, tarsi fulvous, abdomen as broad as thorax, rufous, streaked on the top with black, segments 5—6, very dark, aculeus sickly yellow, shorter than first segment of abdomen. (fem.) Hab. Huddersfield, Yorkshire.—S. D. BAIRSTOW, Huddersfield, May 3rd, 1879.—Since writing the above, Mr. W. H. Harwood, of Colchester, has kindly forwarded me pupæ of *E. lariciata*, infested; these, to my astonishment and satisfaction, have revealed veritable *Septentrionale*. Thus the insect is perhaps common, but has been overlooked. It is easily distinguishable by its yellow face, ovipositor, and thin limbs, but the size of body and abdomen is very variable. I have not succeeded in breeding any male specimen as yet.—S. D. B.

Acronycta alni NEAR NOTTINGHAM.—The larva of *Acronycta alni*, which Mr. Watchorn, of Nottingham, found at Cotgrove in August last, came out June 3rd a perfect specimen, and was exhibited at the Naturalist Society's meeting, June 9th.—JOSEPH BROOKES, Sec.

CATERPILLARS IN THE OLDEN TIME.—It is frequently said that "what is true is not new, and what is new is not true," but sometimes we meet with statements that are neither new nor true. The following quaint quotation is from an old folio Puritan dictionary, the sixth edition of which was printed at London in 1678, and sold by Thomas Sawbridge at the Three Flower-de-luces, in Little Britain:—"CATERPILLAR: an hurtful worm, eating the leaves, buds, flowers, fruits of trees, herbs, corn. It maketh webs as spiders, wherein it wrappeth it self the whole winter, reserving its pestiferous seed; for it casteth certain eggs from it, whence in the spring springeth a brood of many caterpillars. It's of divers

colours, glistereth in the night. It's soft and rough (Jer. 51, 27). It's said to be transformed into a butterfly. The caterpillars are said to eat one another's eggs unless they be carefully wrapped up. They are a judgment inflicted for sin." This dictionary also contains *equally* valuable information "of the nature and properties of beasts, fowls, fishes, trees, plants, fruits, seeds, stones, &c.," said to be "extracted out of the most approved authors," "especially Petri Ravanelli," "first begun by Mr. Thomas Wilson, and enlarged and digested by the diligent care and industrious pains of Andrew Simpson."—J. R. D., Huddersfield.

MALTBY COMMON ENCLOSURE ACT.—A petition has been presented, signed by Rev. W. Fowler, George Brook, ter., F.L.S., and W. D. Roebuck, on behalf of the members of the Yorkshire Nat. Union, to the House of Commons, through Mr. John Barran, M.P., against the proposal to enclose Maltby Common, near Sheffield, which we trust will be successful in its object. Messrs. L. R. Starkey, M.P., and E. A. Leatham, M.P., members of the Union, have also been solicited to support Mr. Mundella, M.P., in his opposition to the second reading of the Bill.

NOTICES OF BOOKS, &c.—"Espèces des Hyménoptères d'Europe et d'Algérie, par Ed. André: tome premier, premier fascicule, 1st April, 1879: chez l'auteur, Rue Poterne, 10, à Beaune (Côte d'Or)."—This work, if carried out in the style proposed in the prospectus, will prove a great acquisition to the literature of hymenoptera, and a great convenience to the student of that order. M. André proposes to issue the book in quarterly parts, each part containing a fixed amount of letterpress and number of coloured plates. The subscription per annum is eighteen francs for the Postal Union. The first part is the introduction to the study of hymenoptera, giving first a sketch of the qualifications possessed by the ideal entomologist (an ideal we fear never yet realised), then notes on entomological nomenclature, a glance at classification, notes on the pursuit of hymenoptera in the field, and the methods of collection and preservation, their determination, and the use of dichotomous tables (which will be largely used throughout the work). The author then gives what will be of the greatest use to students, a description of the anatomy and structure of hymenoptera, illustrated by well-executed plates of the parts alluded to. The introduction will be continued in the second fascicule. On its completion the author's intention is to give a succession of monographs of the various families or groups composing this great order. The descriptions will be thrown into a series of dichotomous tables. Full notes on life-history and economy will form a leading feature in the design, and coloured plates will represent one species at least of every genus, care being taken to select species not before figured. Geographical distribution will also receive its due share of attention. The first family to be monographed is that of the sawflies, or *Tenthredinidæ*; then will probably

follow the fossorial, wasps, and ants. Every monograph is intended to be complete in itself, so that if the herculean labour of describing the whole of the European species compel the cessation of the design, the book will not present an unfinished appearance. In conclusion, let us urge our entomologists to support this most laudable enterprise by becoming subscribers. The price is moderate, and the work will at every stage of its progress be of incalculable value; while the French language ought not to be a bar to its use, considering how small a modicum of that tongue will suffice for the comprehension of entomological literature.—W. D. R.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Monthly meeting (deferred) 24th May, the president in the chair.—A full account was given of the recent excursion of the members to Roche Abbey, and the plants and birds observed during the day, the latter numbering more than ten species, of which the chief were the spotted grey fly-catcher and long-tailed titmouse. Mr. A. Kell's excursion to Goole Moor was also introduced, and amongst the birds noted by him in Broughton Woods, on the following day, was the nightingale, which was also recorded as still singing near Barnesley. A full list of the arrivals of the spring migrants was presented with comparative dates for previous years.*—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting May 27th, Mr. Illingworth in the chair.—Mr. B. Spencer gave a paper on "John Gerard's garden in the time of Queen Elizabeth." Mr. Soppitt read a short paper entitled "A Ramble in the Lake District, and exhibited in illustration *Saxifraga aizoides*, *Cryptogramme crispa*, and many other rare plants.

MEETING June 10th, Mr. Firth in the chair.—Mr. J. W. Carter read a paper on "The origin and purposes of the Society," which he stated to be the thorough investigation of the flora, fauna, and geology of the district. During the five years of the Society's existence it has observed about 1200 species of its fauna and flora.—W. WEST, Hon. Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—The deferred meeting was held on the 9th June, Mr. C. C. Hanson in the chair.—Mr. G. Clayton read a very able and interesting paper on "The Microscope." Amongst the exhibits were a flint axe head, or celt, highly polished, found on Marsden moor. Some botanical specimens were exhibited by Mr. J. Fielding.—W. H. STOTT, Sec.

GOOLE SCIENTIFIC SOCIETY.—On April 25th an excursion was made to Brough and Wressle Castle. A quarry of inferior oolite on the Cave Road, Brough, was examined. The fossils were numerous and well preserved; amongst others found were *Rhynchonella spinosa*, *Lima bellula*,

* We shall insert this list in our next issue.—EDS. NAT.

Pecten demissus, &c., but all had been recorded by members of the Society at previous visits. Mollusca: *Helix virgata* and *Helix erietorum*. One fungus *Peziza cerea* new to the district was found. At Wressle the party were met by Rev. R. Kennedy and were conducted by him over the ruins of the Castle, where they learnt some interesting particulars of its history. Owing to a continuous downpour of rain no attempt was made to examine the flora of the neighbourhood. On the walls and near the ruins were found *Arabis Thaliana*, *Draba verna*, *Corydalis lutea*, *Asplenium Trichomanes*; near the Castle *Narcissus pseudo-narcissus* is very abundant and blooms freely. Mosses, *Mnium undulatum*, *M. punctatum*, &c. Hepaticæ, *Fegatella conica*. Lichen, *Physcia parietaria*.—THOMAS BIRKS, Jun.

THE SECOND EXCURSION of the season was made on May 16th, to Cottingham and Beverley. The party walked through pleasant fields past Cottingham chalk pits, Risby Park, Walkington, Westwood and Burton Bushes to Beverley. At the chalk pits good sections of the upper or white chalk (with flints) were seen, capped in one of the pits with drift beds. Some remarks explaining the character and geological history of the chalk were made by the president. No fossils were found here, but at Mr. Fisher's whiting works near Beverley, where the chalk is quarried to a depth of nearly 150 feet, a collection of fossils found on the spot was examined; they comprised but few forms, the principal being *Belemnites mucronatus* (the last of its race), *Ananchytes ovatus*, and several kinds of sponges, especially *Ventriculites*. Westwood is not, as its name would lead one to suppose, a wood, but a wide open common left by an abbot of old to the freemen of Beverley. At one corner of it, however, is a genuine bit of ancient forest—Burton Bushes—with venerable oaks and tall holly bushes scattered about in picturesque disorder, and open green glades between them. 103 flowering plants, 21 mosses, and some lichens and fungi were observed. Among the birds noted were the swift, swallow and martin, the chiff-chaff, willow-wren, coot, waterhen and stock dove, as well as the more common species.—THOS. BIRKS, Jun.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting, May 26th, the president, Mr. S. J. Capper, in the chair.—Mr. Wall read a paper on "The use of the Microscope in the Study of Entomology." The author laid special stress on the impossibility of a scientific and systematic prosecution of the study without the aid of microscopic research. On the conclusion of the paper, the subject was further illustrated by the exhibition of a series of entomological preparations by several members and friends, who had kindly lent their microscopes for the occasion.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—334th meeting, May 20th, Mr. B. Holgate, F.G.S., in the chair,—Mr. W. Barwell Turner, F.C.S., read a short paper on the pea-crab (*Pinnotheres*

pisum). Mr. H. Marsh showed *Clostera anachoreta*, bred from a larva taken at Paris ; Mr. John Grassham, the eggs of the three British divers—the great northern (*Colymbus glacialis*), the black-throated (*C. arcticus*), and the red-throated (*C. septentrionalis*), and described their habits. Progress was made with the compilation of a list of Yorkshire birds, and dates of the arrival of migrant birds given by Mr. W. Raine and other members. Mr. James Abbott showed a living specimen of very young salmon trout (*Salmo ferox*) with the yelk-bag attached ; Mr. W. Lobley, a Smith & Beck's universal microscope ; Mr. Turner, blood of man, frog, toad, and blind-worm.

335TH MEETING, May 27th, Mr. Holgate in the chair.—Specimens from Wetherby, sent by Dr. Wesley as a donation to the local collections, were exhibited, including the missel thrush, jay, common snipe, starling, jack snipe, blackbird, hedge sparrow, meadow pipit, tree sparrow, red-wing, yellow hammer, song thrush, chaffinch, skylark, blue tit, greenfinch, fieldfare, house sparrow, great tit, corncrake, little grebe, rook, wild drake, brown owl, weasel, and squirrel. Mr. Washington Teasdale criticised the recent planting of plane and lime trees (which he regarded as very unsuitable to the atmosphere of Leeds) on Woodhouse Moor. Mr. Francis Somers exhibited a collection of eel fare, gathered in one of the tidal rivers ; at this season they are passing up to the fresh water in thousands from the breeding grounds ; Mr. Jas. Abbott, *Euglena viridis* and the first stage of *Draparnaldia glomerata* ; Mr. F. Emsley, the germination of bulrush seeds (*Typha latifolia*), a notable specimen.

336TH MEETING, June 3rd.—Mr. Turner showed polypi of various species ; Mr. W. H. Kirtlan exhibited a considerable variety of gatherings of general character from Askham Bog, including *Batrachospermum moniliforme*, *Volvox globator*, freshwater entomostraca, &c ; Mr. F. Emsley, mounted specimens of freshwater algæ, &c., also from Askham Bog ; these were very fine, particularly a *Batrachospermum*, *Chætophora*, and a slide of curious floating water moss (unnamed).

337TH MEETING, June 10th.—Mr. W. E. Clarke gave an account of a recent excursion to Valkenswaard, in North Brabant, and exhibited the following nests and eggs which, with many others, had been found :—the great grey shrike (*Lanius excubitor*), the golden oriole (*Oriolus galbula*), the blue-throated warbler (*Cyanecula suecica*), the crested tit (*Parus cristatus*), and the pintail duck (*Anas acuta*). Mr. Charles Smethurst exhibited a long series of variations of *Smerinthus populi*, bred from Leeds larvæ, *Selenia illunaria*, taken at Chapel Allerton May 19th ; *Odonotopora bidentata* from Seacroft ; *Cidaria corylata*, the only lepidopterous insect taken (in the larval state) at the Ingleton meeting of the Union ; *Axylia putris* ; and *Triplasia urticæ* from Thorp Hall. Mr. W. Marsh showed a number of insects taken in the New Forest at Whitsuntide ; Messrs. Turner and Emsley showed the pollen of a number of plants.

338TH MEETING, June 17th, Mr. W. Barwell Turner, F.C.S., in the chair.—On behalf of Mr. Emmet of Boston Spa was exhibited *Clausilia bidens* from the Colosseum, Rome. Mr. Washington Teasdale exhibited a type-slide of nine genera of mosses, mounted by Mr. J. Bagnall; Mr. F. Emsley, freshwater algæ and diatoms from Moortown and Askham Bog; Mr. Turner, stained and decolorised fern-fronds (*Ceterach*, *Polypodium*, *Asplenium*, &c.—W. D. R.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Ordinary meeting, the president (Mr. John Whitehead) in the chair.—The honorary secretary (Mr. Thos. Rogers) having read some interesting correspondence, the president exhibited a specimen of the rare *Zygodon Stirtoni*, Schm., (*Z. aristatus*, Lindb.) with young fruit, lately gathered by Mr. Percival near Barmouth, in company with the president and Messrs. Ashton and Nield. The plant is closely allied to *Z. viridissimus*, differing from it chiefly in the excurrent nerve, in growing on rocks and not on trees. The occurrence of a variety of *Mastigobryum deflexum*, Nees., at Tyn-y-Groes, near Dolgelly, was reported by Mr. W. H. Pearson, and a specimen gathered by him in company with Dr. Carrington on the 12th of April, was exhibited. Another rare cryptogam exhibited by the president, was *Zygodon Nowellii*, so named by Professor Schimper in honour of its discoverer the late John Nowell of Todmorden, but described formerly by Mr. Wilson under the name of *Z. gracilis*; the specimen was received from Mr. West, who gathered it at Ingleborough last Easter. Mr. Rogers exhibited specimens of a number of Indian ferns which had been collected on the Himalayas, which were interesting on account of their identity with species indigenous to Britain; amongst them were *Cystopteris fragilis*, *Asplenium septentrionale*, *A. fontanum* and *A. Adiantum-nigrum*. The president mentioned that he was mistaken in his surmise about the *T. Bambergeri* mentioned at the last meeting.

MEETING, June 16th, Mr. Thos. Brittain in the chair.—The chairman exhibited two species of parasitic fungi, *Æcidium tragopogonis* and *Puccinea glomerata*, from Southport—the first upon the leaves of *Tragopogon pratensis*, and the latter infesting those of *Senecio Jacobæa*. Several mosses, also from Southport, were exhibited by Mr. Holt, including *Meesia uliginosa*, *Bryum calophyllum*, *Hypnum lycopodioides*, *H. polygamum*, and *H. Wilsoni*; very fine specimens of *Bryum turbinatum*, from Clifton, were shown by Mr. J. Makin; and Mr. C. Wild brought some rare *Hepaticæ* which he had gathered during the preceding week in Cumberland. One of these was *Lejennia ovata*, from Lodore, a species not previously known to grow in England. The hon. secretary (Mr. Rogers) informed the meeting that he had been with the president and a party of friends in West Yorkshire, but had returned in order to attend the present meeting. They found some mosses still unripe and unfit to gather, on account of the severity of the past winter; but others were in beautiful condition, and he had the pleasure of exhibiting *Encalypta ciliata*, *Mnium serratum*, *Bartramia gracilis*, *Leskea rufescens*, and one or

two others ; but the more interesting of the things collected would be reserved for the president to exhibit and say something about at the next meeting. He (the president) had again gathered, but in small quantity, the rare *Seligeria tristicha*, and it was believed also *S. acutifolia*, and *Zygodon Nowellii*.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, May 31st, Mr. T. Stott, V.P., in the chair.—Mr. C. Sheard exhibited and named a number of botanical specimens. A good number of geological specimens were collected by the members during the day, which were named by Mr. J. Spencer, amongst them being *Lepidodendron selaginoides*, *Lepidostrobus*, *macrospores*, fern stems, a very beautiful specimen of *Goniatites Listeri*, *G. paradoxus*, *Nautilus*, *Orthoceras*, and *Sigillaria vasculare*. Mr. T. Hirst exhibited the great-eared grebe and a pair of dabchicks in a case, both from Keighley, and a specimen of the emperor moth (female).—J. OGDEN.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, June 4th, Mr. Spurling, V.P., in the chair.—Mr. Sims showed some good specimens of *A. gilvaria*, *G. obscurata*, *C. temerata*, and others.

YORKSHIRE NATURALISTS' UNION.—The third meeting for 1879 was held at York on Whit-Monday, the 2nd of June, for the exploration of Askham Bog, a well-known and most prolific piece of virgin ground, for which permission had been granted by Capt. Severne. Here most of the members remained throughout the day, to their extreme profit and delectation, and very little was seen of other parts of the environs of York. The meetings were held in the Victoria Hall, Goodramgate, York. In the absence of the president and all the vice-presidents but one, the chair was occupied by Mr. Councillor Bulmer, ex-sheriff of York. It was found that fourteen societies were represented, and the attendance of members was about 60 or 70. The Dewsbury Naturalists' Society was admitted into union, on the motion of Mr. P. F. Lee, of Dewsbury. The secretary announced the names of Messrs. W. Gregson of Thirsk, W. Jenkinson of Sheffield, and W. Whitwell of York, as new subscribers, and a vote of thanks was passed. Mr. Hick, B.Sc. (Harrogate) proposed a vote of thanks to the local secretary (Mr. W. Prest) and the members of the York Society who assisted him ; and to Capt. Severne for permission to explore the Bog, which was passed. Mr. C. P. Hobkirk, F.L.S., was appointed to represent the Union on the Council of the British Association at the Sheffield meeting. It was announced on behalf of the Council that they had, at the request of the Sheffield Naturalists' Society, petitioned the House of Commons against the proposed enclosure of Maltby Common. The reports of sections were then taken. Mr. S. D. Bairstow, secretary of the Entomological Section, reported that the district would probably be found one of the richest in the county, though from the very late spring, little had been done that day. The best species taken was *Orgyia gonostigma*, of which a few larvæ were beaten out of

birch in Askham bog. *Tephrosia biundularia* was common at Sandburn, with various other species. *Eupithecia lariciata* and *Melanthia albicillata* had been taken at Bishop's Wood, near Selby, by members who had called there on their way to the meeting. Dr. Parsons, secretary of the Botanical Section, reported that the undulating clay and alluvial country in the neighbourhood of York had yielded little but the ordinary plants of cultivated lowland districts. Askham Bog was a swampy thicket, occupying the surface of a peat bed which filled up a depression in the clay; it was probably a relic of the conditions which formerly prevailed over a large part of the vale of York. The flora of the Bog had in the main a peaty character, but the absence, so far as observed, of the heaths and the foxglove, and the presence of certain limestone-loving plants, indicated that the soil partook somewhat of a calcareous nature. Owing to the backwardness of the season comparatively few species were found to what would have been the case later in the year, but some of those found were of considerable rarity. 179 Vasculares were seen, among the rarer being *Ranunculus Lingua*, *Stellaria glauca*, *Carduus pratensis* (a southern plant), *Hottonia palustris*, and *Cladium Mariscus*. The special rarity at Askham Bog was, however, a sedge; *Carex paradoxa*, which grew in tall tussocks plentifully all over the Bog, but found in only three out of the 112 counties of Great Britain. Of ferns, *Nephrodium Thelypteris* and *Osmunda regalis* were abundant in the Bog, but in deference to the desire of Capt. Severne no specimens were brought away. In neighbouring ditches were found *Chara syncarpa* and *Riccia natans*, a curious little liverwort closely resembling a duckweed in its appearance and floating habit. Twenty-seven mosses were found, among them being *Tetraphis pellucida* (in fruit), *Cinclidotus fontinaloides* (Naburn Lock), *Climacium dendroides*, and *Hypnum cordifolium*. Among algæ were *Oscillatoria nigra*, *Euglena viridis*, *Chætophora tuberosa*, *Coleochæte scutata*, *Batrachospermum moniliforme*, *Pandorina morum*, *Closterium moniliforme*, and *Mougeotia genuflexa*. But few hepaticæ, lichens, or fungi were seen. Mr. E. Jones, of Embsay, near Skipton, who was the only geologist present, stated that the chief point of interest in that section was a splendid series of photographs of the sections of the boulder clays exposed in excavating for the York new goods station, exhibited on behalf of Mr. J. E. Clark, B.A., B.Sc. There were no representatives of the Vertebrate Section present, and the only bird reported was the house martin, building near Chandler's Whin. Mr. J. D. Butterell of Hull reported for the Conchological Section, in the absence of its officers. He stated that 12 land and 13 freshwater shells had been collected, including *Planorbis lineatus* and *Valvata cristata*. The circular having stated that 86 species have been recorded for the district, and given a list of shells which had not, *Helix sericea* was announced as an addition to the list, having been collected so long ago as 1858. This shows the value of so writing the circular as to show the deficiencies in the knowledge of the fauna and flora of the district to be worked out.—W. D. R.

Diary.—Meetings of Societies.

- July 1. Bishop Auckland Naturalists'. Liversedge Naturalists'.
„ 2. Wakefield Naturalists'.
„ 9. York and District Naturalists' Field Club.
„ 11. Huddersfield Scientific Club.
„ 14. Manchester Cryptogamic Society.
„ 19. Yorkshire Naturalists' Union—Excursion to Hebden Bridge, for
Hardecastle Crag, &c.—Local Secretary, Mr. C. P. Hobkirk,
F.L.S., Huddersfield. North Staffordshire Naturalists' Field
Club—Excursion to Hawkestone.—Leader, Mr. Kirkby.
„ 28. Lancashire and Cheshire Entomological Society.
-

AT a Meeting of the VERTEBRATE SECTION of the YORKSHIRE NATURALISTS' UNION, held at Ingleton on the 14th of April, it was resolved to publish as the commencement of series B of the "Transactions" of the Union a **LIST OF THE BIRDS OF YORKSHIRE**, to include all recorded occurrences of the rarer species as far as is practicable. Its compilation was placed in my hands. I now appeal to all our ornithologists to give me their best assistance in the work by sending at once from all parts of the county **LISTS**, with remarks as to the distribution, abundance, breeding, and rare occurrences of the ACCIPITRES (Eagles, Hawks, and Owls) only, as the work will have to be done gradually. When the list of this group is completed, it is contemplated to apply for information on the next succeeding group. All assistance will be duly acknowledged.

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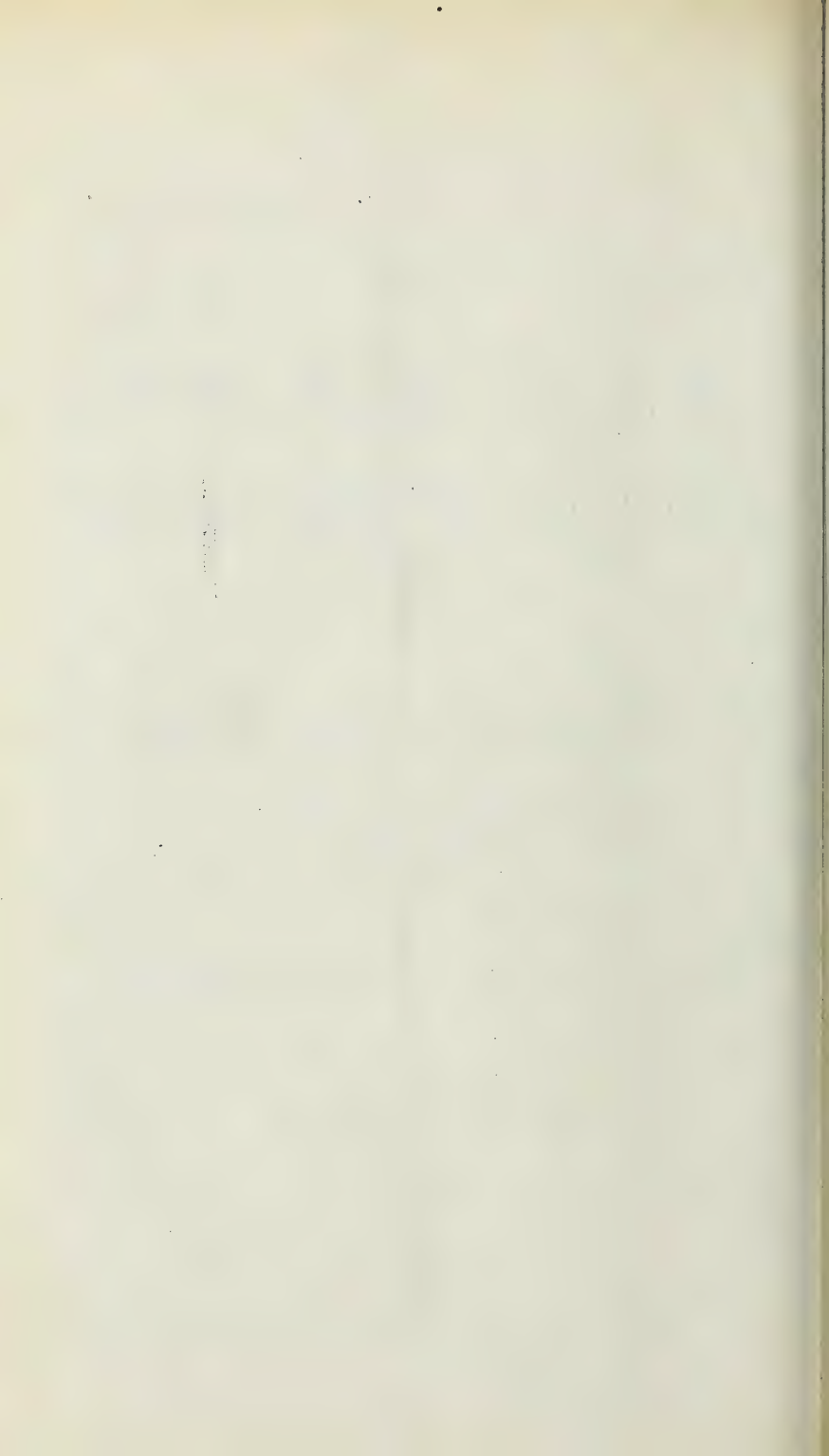
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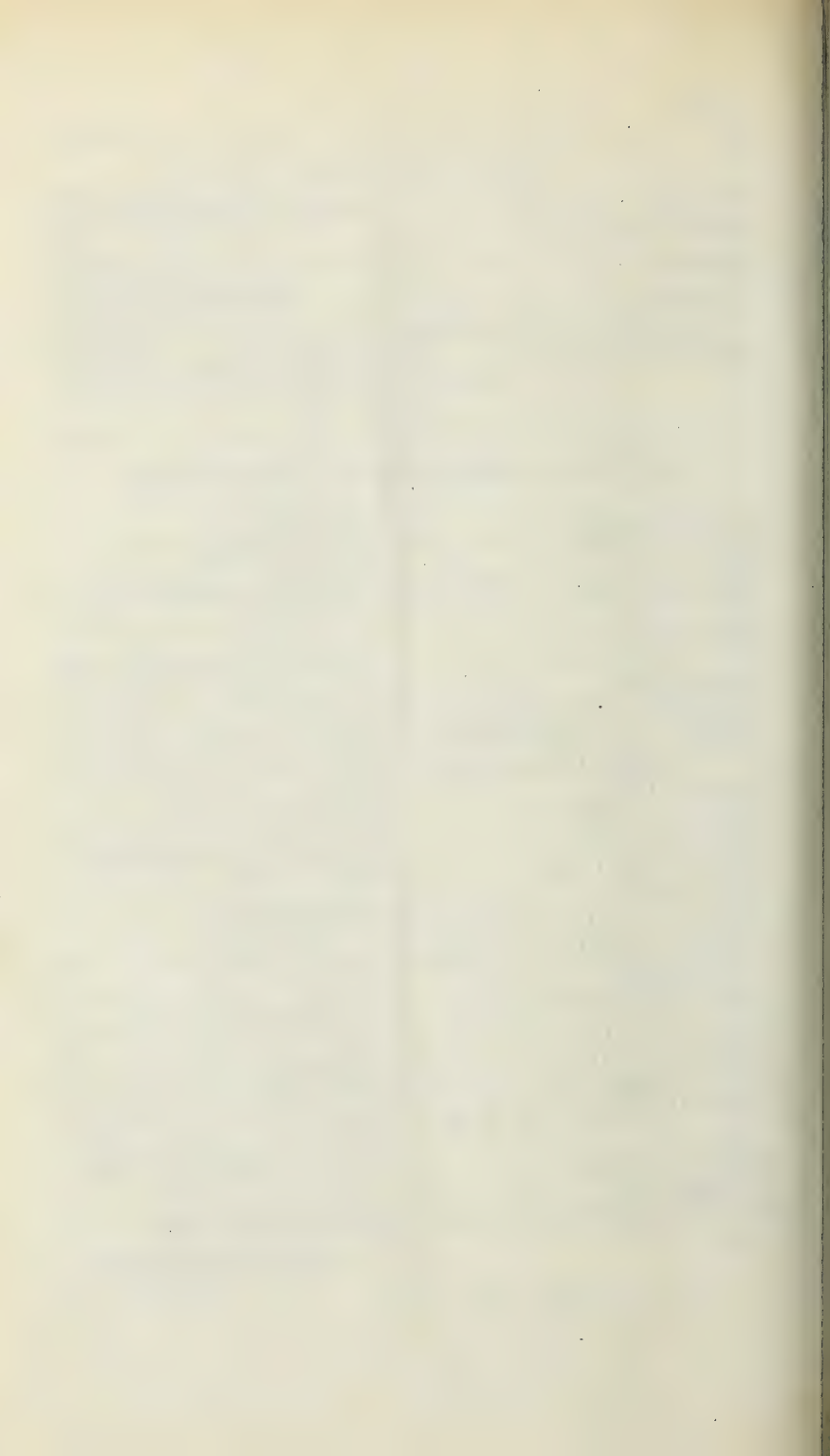
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AUGUST, 1879.

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the meetings, it would be better if they were furnished to us as notes or papers, and then only referred to in abstract in the reports.

Reports of the meetings of Local Societies will always be gladly received and inserted. It should be understood, however, that as our space is limited, discursive reports would occupy too much room. Papers on Natural History subjects read at these meetings, if of sufficient general interest and value, and containing original matter, should be sent for insertion as "Original Articles," under which heading we shall also be glad to publish original papers not read at any meeting.

In conclusion, we again ask for that generous and cordial support we have already received, in return for which our own labours in editing and issuing the Journal will be lightened, and made a pleasure. *Labor ipse voluptas, et omnia vincit.*

Original Articles.

ARRIVAL OF SPRING MIGRANTS IN SOUTH WEST YORKSHIRE.

BY THOS. LISTER.

THE whole of our summer migrants known to South-West Yorkshire having arrived, I give a complete list for the present as compared with the past year, and the average for ten years, as I think it will be interesting to compare these dates. There are some exceptionally early arrivals which may be considered accidental ones (where this is the case a second date is given), as many individual birds, and the main body of all the species, were later. One thing was remarkable in the late comers—they did not sing or utter their usual call notes for many days after they had been seen. They appeared starved, having found only scanty leafage to shelter them. The cuckoo did not sing for ten days after it was seen, also the willow warbler and the chiffchaff. The wood warbler was not heard nor seen again, after being first observed, for more than a month. The fact of this season, on account of its severity, being the most remarkable which naturalists

have known as to the irregular arrivals of birds, will justify the following details :—

	1879.	1878.	Average date for 10 years.
Whinchat	Mar. 17.....	April 21.....	April 20
2nd date	April 21		
Wheatear	Mar. 22.....	„ 5.....	Mar. 29
2nd date	April 5		
Chiffchaff	Mar. 23.....	„ 11.....	April 2
2nd date	April 1		
Sand martin	„ 5.....	„ 21.....	„ 9
2nd date	„ 14		
Yellow or Ray's wagtail ..	„ 5.....	„ 10.....	„ 13
2nd date	„ 8		
Willow warbler	„ 8.....	„ 7.....	„ 10
Wood warbler.....	„ 8.....	May 3.....	May 3
2nd date	May 17		
Cuckoo	April 7.....	April 16.....	April 14
2nd date	„ 11		
Swallow	„ 11.....	„ 6.....	„ 10
2nd date	„ 16.....	„ 11	
Ring ousel	„ 14.....	„ 26.....	„ 15
Tree pipit	„ 14.....	„ 16.....	„ 15
2nd date	„ 15		
House martin	„ 21.....	„ 13.....	„ 14
Grasshopper warbler ...	„ 22.....	„ 17.....	„ 30
Grey flycatcher	„ 23.....	„ 30.....	May 14
Blackcap warbler	„ 23.....	„ 22.....	April 22
Whitethroat	„ 22.....	„ 22.....	„ 25
Landrail	„ 22.....	„ 21.....	„ 10
Redstart	„ 25.....	„ 12.....	„ 14
Sandpiper	„ 25.....	May 12.....	May 3
Lesser whitethroat.....	„ 29.....	April 22.....	„ 4
Nightingale	May 1.....	„ 24.....	„ 8
Pied flycatcher	„ 2.....	„ 12.....	April 22
Sedge warbler.....	„ 3.....	„ 26.....	„ 24
Swift	„ 11.....	May 13.....	May 8
Garden warbler	„ 17.....	„ 4.....	„ 6
Night jar.....	„ 22.....	„ 14.....	„ 18

Barnsley, May 9th, 1879.

PERSISTENT VARIATION AMONG THE BRITISH SPECIES OF BUTTERFLIES.

BY S. L. MOSLEY.

(Concluded.)

FIRST on our lists is *Papilio Machaon*—an insect so constant that we rarely see a variety except in size and density of colour. In England it is large; in Switzerland, small; in America, deep rich orange colour. In the south of Europe they have a form they call *Sphyrus*, Hb.: the fore wings are darker, and the blue spots on the hind wings larger than in the type.

Leucophasia sinapis, the next insect, is subject to several deviations from the ordinary type. The one called *Lathyri*, Hb., Mr. Gregson assures me is quite distinct. The difference is on the underside of the hind wings, which are dark with two light dashes, these being placed in the opposite direction to that of the ordinary dark shading. This variety is found only in the south of Europe. Then there is the one without the ash-coloured tip, which was described by Newman and others as the female. This, I believe, is the variety *Erysimi*, Bkh., and may occur only in the female, but the absence of the dark tip I do not believe to be the distinguishing sexual character.

The next form is *Diniensis*, Bdv., in which the under surface of the hind wings is without markings. Mr. Doubleday says: "In the northern parts of Europe the individuals of the autumnal brood only differ from the vernal ones in being rather smaller, but in the southern parts of Europe they differ so much from the spring brood that they were formerly considered by many entomologists to be a distinct species. The ground colour of the wings is pure white, and the male has a circular black spot at the apex of the anterior wings which does not extend to the margin; the under surface of all the wings is pure white, but in some individuals there are a few faint marks. This variety occurs in the New Forest and in Tilgate Forest." According to Staudinger, there is a fourth form of *sinapis* called *Amurensis*, Mem. I do not know it, however. I think it is a Siberian variety.

The British species of the genus *Pieris* are subject to two seasonal variations—vernal and autumnal broods. Stephens separated them as probably distinct. *Sabellica* was the spring brood of *napi*; *metra* the spring brood of *rapæ*; and *Chariclea* either the spring brood of *brassicæ* (H.D.) or a modification of the male, having the inner edge of the black tip straight in the variety, and arched between the veins of

the type (C.S.G.) *Sabellica* and *metra* differ from the later broods of the same insects in being smaller and having a greater preponderance of black. But anyone may see the difference of these two common species by capturing a series of each brood for themselves.

Besides these, *napi* is subject on the Alps to a dark form of the female having the wing rays clothed with dark scales : it is called *bryonæ*, Och., and I have seen British specimens nearly approaching to it ; but in all the British examples I have seen the dark spots on the upper wings show, whereas in the true alpine *bryonæ* the dark spots are obliterated, at least in those specimens which I have seen. The variety *napææ*, Esp., is larger than the type, and has no green veins on the underside of the fore wings. Since the introduction of *rapæ* into America, a variety of a bright sulphur yellow has turned up there, and has been named *aurea*, and specimens having a decided yellow tint have sometimes occurred in this country. *Daplidice* here is only single-brooded, so we only get one form, but on the Continent they have two seasonal varieties. They have also a form to which they have given the name *Bellidice*, H.S. (non Bramb.). It may be distinguished by being smaller and very dark in the green on the underside.

Of the genus *Anthocharis* we have only one species, and that pretty constant, except with regard to size and the production of hermaphrodite coloured specimens ; some very curious ones are known to me, and are and will be figured in my book on varieties, one having the ground colour yellow, and thus approaching *Eupheno*, Esp., if, indeed, it be not a reversion to that insect (coll. C. S. Gregson).

Gonepteryx rhamni has the variety *farinosa*, Zett., which is without the orange spot on the fore wing, and has a mealy appearance. Mr. Gregson has specimens from North Lancashire with the orange spot all but imperceptible.

Then there is *Gonepteryx Cleopatra*, Linn., which some say is nothing more than a geographical form of *rhamni*, though generally looked upon as a good species. It differs from *rhamni* in having orange on the fore wings diffused into a large patch in the male, covering a great portion of their surface. It is found in Spain and the south of France. M. Boisduval is stated (H. & W.) to have reared *G. rhamni* and *G. Cleopatra*, from eggs deposited by a female of the former, and there was no difference in the larvæ.

We now come to the two British species of *Colias*, and in the wonderful *Edusa* year of 1877 we had ample opportunity of studying the variations of that species. The greater number of the different

species of *Colias* with which I am acquainted are subject to a pale variety of the female, though in some cases—as, for instance, in *Palæno*, Linn.—the pale form seems to have become the type, and the dark form the variety (*Werdandi*, H.S.).* The pale variety of *Edusa* called *Helice* is well known, and *Hyale* has also a pale form of the female which has as yet received no name. It used to be supposed that all the light *Hyale* were females, and all the dark ones males, but I think this notion has been laid on one side by most entomologists. I have seen specimens of *Hyale*, from Abyssinia, of a beautiful yellowish-orange tint, but whether they are all alike from the same place I cannot say. The variety *Sareptensis*, Stgr., has the hind margin of the hinder wings broadly black, and occurs—as its name indicates—in South Russia.

In the different species of *Argynnis* there are many varieties, the best-known example with us being *A. Paphia*, var. *Valezina*, which is a very dark form of the female of that insect, and not rare in the New Forest. *A. Adippe*, var. *Cleodoxa*, and *A. Niobe*, var. *Eris*, are each void of silver spots. *Aglaia* is subject to a variety called *Charlotta*, “which are dark females” (C.S.G.), and frequently have nineteen instead of twenty-one silvery spots on the underside of the hind wings, several at the base being confluent. I think this is mentioned by Newman. *A. Adippe*, var. *chloradippe*, H.S., is tinged with green underneath the hind wings. This, Mr. Gregson tells me, occurs at the Devil’s Galop, North Lancashire. Variety *Cleodoxa*, I believe, has been mistaken in Britain for *Niobe*, but Mr. Gregson showed me an unmistakable specimen of *Niobe*, var. *Eris*, which he says he took at the Devil’s Galop. Of the *Melitææ*, *Artemis* has many named varieties. *Merope*, Prun., is the alpine form; it is smaller, more distinctly marked, and not so greasy-looking as the type. It is found on the Alps, and also in Scotland.† *Hybernica*, Birchl., is the Irish form, more woolly than the type, and the light spots near the apex of the wing generally very distinct and often almost confluent—in fact, divided only by the wing rays.

Another variety—*provincialis*, Boisd.—is found in Central Europe, “and at Lydgate, in Lancashire” (C.S. G.) I have had specimens

* This is a variety of the female only, and therefore it is just the same as *Edusa*, only the pale female of *Palæno* being more abundant than the yellow, the former is considered the proper form of the female. Probably all the *Colias* have pale females; I have one of *Philodice* from N. America. So with *Hyale*, the pale female being commoner is considered true.—J. E. R.

† I don’t think the Scotch form is *Merope*. *Hybernica* approaches *M. cynthia*. I find *Artemis* varies in every different locality from those taken elsewhere. I have some Hertfordshire specimens as large and very like *provincialis*.—J. E. R.

from Hungary. This is larger than the type, lighter, and the colours more blended—in fact, it is in all respects quite the opposite extreme to the var. *Merope*.

In the *Vanessidæ* there is a very marked form found in Corsica and Sardinia, which is generally said to be a variety of *urticæ*,* but which might prove distinct. Mr. Frederick Bond, F.Z.S., tells me he thinks there is some difference in the larvæ. It is called *Ichnusa*, Bon., and I think has as much claim to be considered distinct from *urticæ* as *Hospiton* has to be considered distinct from *Machaon*. The general tone of the insect is more orange, and it is without the two isolated dark spots on the upper wings usually found in *urticæ*. There is an intermediate form between the two found in Turkey, called *Turcica*, Stgr. The var. *polaris*, Stgr., is dark, and has the spots large and confluent. *V. Io* var. *Ioides*, Och., differs from the type only in being much smaller, and may be reared artificially. Of *V. Antiopa* there are two well-known forms—the white and the yellow-bordered ones—the latter being the type, and the former the var. *Hygiæa*, Hrdch., I believe.

Of *Liminitis Sibylla* there is a dark form which has occurred in the New Forest. Sometimes the usual white band is entirely obliterated.

Arge Galathea is subject to several freaks, the most distinguishable being *leucomelas*, Esp. The difference is on the under side of the hind wings, which are devoid of the usual dark markings. I am not aware that it has been taken in England.

Next comes our *Erebia Cassiope*, which is but a variety of the type *Epiphron*, Kn. The latter has white pupils in the centre of the black dots, while those of the former are entirely black. In Scotland the females have white pupils. The range of the var. *Cassiope* is more extensive in Europe than that of the type *Epiphron*. *Blandina* has a variety of the female, which has the under side of the hind wings banded with ashy-grey or bluish, but it is not distinguished by any name from the type.

Of the genus *Satyrus* I know little. *Janira*, var. *Hispulla*, Hub., is a modification of the female, with the apical yellow markings large and distinct, and the black eyes with two white dots. *Semele*, var. *tarisæus*, Bon., is a rich fulvous form of that insect. Our *S. Aegeria* is the var. *Aegerides* of Staudinger, the type being found in southern Europe, and differing from ours in having the pale markings

* I think this insect gets darker further north. *Ichnusa* as a southern form has less dark markings—*Polaris*, which I do not know, has more than the type.—J. E. R.

orange yellow instead of pale ochreous. *S. Hyperanthus* var. *arete*, Müll., has white spots underneath in place of the regular eyes. I have seen specimens of this variety in the late Alfred Owen's collection, which have every appearance of being British, though I was not before aware that it occurred even in Europe.

Both the species of *Cænonympha* are variable. *Pamphilus* has a variety called *lyllus*, with a dark border all round the margin of the wings. I have taken this variety at Sherwood Forest, and it occurs no doubt, wherever *Pamphilus* is common. But there is a much more distinct variety, which I believe is unnamed, the ground colour of which is a dingy straw, much paler than the usual ochreous. *Davus* is very variable. The variety we usually call *Rothliebii*, Stgr., has the eyes very large and distinct, showing plainly on the upper side. The variety *Laidion*, Bkh, has fewer spots, less visible on the upper side. It is found in Scotland and Ireland. The variety *Isis*, Thup., is the Lapland race; they are small insects, and usually have no eye spots at all. It is also found, I believe, in the north of Scotland. Mr. J. E. Robson, of Hartlepool, suggested to me that the eye spots of *Davus* disappear as we get further north, and I believe this is correct.

Polyommatus phlæas has two named varieties: one is *Schmidtii*, Gerh., which is the one having the ground colour silvery instead of coppery. Intermediate varieties occur having the ground straw-coloured. Both these have been taken in many parts of England. The other variety is *Eleus*, Fab.; it is very dark in the coppery part, and the spots are not so distinct as in the type; it is also somewhat shot with purple. This variety is not uncommon on the Continent, and I believe I have taken it at Sherwood Forest, though I am not aware that it has been previously recorded as British. A third variety (unnamed) is without the coppery band along the margin of the hind wings.

Of the "Blues" *Lycæna Agestis** is the most noticeable for its amount of variation. The general form of this insect in the south and midland counties of England is blackish brown, dotted around the border with orange red. From the midland northward as far as Witherslack, the orange spots become less and less conspicuous,

* I have always considered the three forms of this insect were best divided thus:

TYPE: Upper side, black spot on centre of fore wing; under side, white spot with black centres.

SALMACIS: Upper side, black spot as in type; under side, no black centre to spots.

ARTAXERXES: Upper side, white spot in centre of fore wing; under side, white spots as in *Salmacis*.—J. E. R.

until at Castle Eden Dene, in Durham, they finally disappear in most specimens if not in all, and a white dot appears in the centre of the fore wings of the female. This is the *Salmacis* of Stephens, who considered it a distinct species. Then further north still—in Fife-shire—all the wings have a white dot in the centre, and this is still by some considered a distinct species. Mr. Buckler, however, could detect no difference in the larvæ. This form is called *Artaxerxes*, Fab. The second brood, in which the under side is brown, is called *Æstiva*, Stgr., on the Continent. *L. Alexis*, var. *Icarinus*, Scriba, has no spots on the under side of the fore wings between the central spot and the base. My friend Mr. Robson says that he believes this is a common variety in England; he took two one afternoon, asleep on flowers, where the variation was plainly visible.

Of *Adonis*, the variety *Ceronus*, Esp., is the female, very much streaked with blue on the upper surface, and a series of orange lunules along the hind margin of the hind wings. *Cinous*, Hub., has the spots below not eyed. The variety *Pollona*, Zett., is the same as *Ceronus*, with the blue confined to the hind wings. *L. Corydon*, var. *syngrapha*, Kef., is a similar modification of that insect to *Ceronus* of *Adonis*. Neither, I believe, has yet been recorded from England, though I have seen insects very nearly approaching to both of them. The variety *Apennina*, Zett., is a pale form from the Italian mountains; *Hispania*, H.S., is something similar from Spain; *albicans*, H.S., is whiter still, while *Corydonus*, H.S., is violet-blue, and *Caucasica*, Stgr., sky-blue. *Argiolus*, var. *hypoleuca*, Koll., has no spots on the underside. *Alsus*, var. *Lorquinii*, H.S., has the male shot with blue. *Acis* has several named varieties: *Ballis*, Frr., is large, with red spots underneath; *Parnassia*, Stgr., is similar, but small; *Helena*, Stgr., has a red marginal “fascia” on the underside; and *Antrochæna*, Ld., has the same above on all the wings. This latter is a modification of the female. *Arion* sometimes occurs small and without spots. I have seen this variety in several collections in the south of England. I am not aware that any of the named varieties of *Adonis*, *Corydon*, or *Acis* have occurred in England.

We now come to the last family of British butterflies—the skippers—in which occur one or two beautiful variations. One is the variety of *alveolus*, which is figured by Newman as *Lavateræ*, but this I believe is identical with the *Taras* of Meigen, and the latter name having the priority, Newman’s must be sunk. It is that with large confluent spots in the centre of the wings. This variety has occurred in England. The only other variety is the bone-coloured *linea*. There

is, however, another species on the Continent which comes very near to *linea*, and may only be a variety of it; it differs from *linea* in having the underside of the hind wings of one colour, and not having a fulvous inner margin as in our insect. It is called *lineola*, Och.

This concludes my list of the butterflies. Many other interesting varieties occur with which I am not acquainted, and also in moths many remarkable forms and varieties might be found, and I hope that before long these will be worked out and catalogued in a proper form. This is a little bit of unworked ground for the British entomologist to enter into.

Primrose Hill,
Huddersfield.

Short Notes and Queries.

PERCHING OF THE REDSHANK (*Totanus calidris*).—In last month's *Naturalist* (vol. iv., p. 184) Mr. Bunker asks if it is usual for the redshank to perch on a tree. In reply I beg to state that it is no uncommon sight on the Continent to see this and others of the class *Grallatores* perched on trees. It is, perhaps, the absence of trees in their usual haunts in this country that accounts for the non-observance of this habit. Speaking of the curlew in Norway, Mr. Hewitson, in his "Eggs of British Birds," 3 ed., vol. ii., p. 323, says:—"We afterwards found it, however, to be a practice by no means uncommon with the redshank and the greenshank to settle upon trees; and what surprised me more was to see the long-legged curlew alight, as it frequently did, on the top of the highest trees of the pine forest, and to hear it as it passed from tree to tree utter its loud clear whistle." This habit is quite characteristic of the closely allied species, the spotted redshank, and has also often been recorded of the common sandpiper.—WM. EAGLE CLARKE, Leeds, July 3rd, 1879.

BUZZARD v. KITE, AT BINGLEY.—In the *Naturalist* for February, 1878, Mr. Butterfield records the occurrence of the kite at Bingley, identifying the species on grounds that I consider to be extremely doubtful, even on Mr. B.'s own showing, for he says "I must confess, however, its light-coloured (in fact it seemed almost white) head somewhat puzzled me." Now, as he was so near that he could see the colour of the head, it is a pity that he did not pay a little attention to its tail, for by this alone the kite may be identified at once beyond the possibility of a doubt the tail in this species being very long and deeply forked, and very conspicuous. The buzzard is subject to great variety—light-coloured,

even white, heads being by no means uncommon. Then again, Mr. B. says "its mode of flight is so distinctive I could not be mistaken," and he describes it as "effected in large sweeping circles." This applies equally well to the flight of the buzzard, which I have had the pleasure of watching on several occasions. In the absence of more weighty evidence, which I trust may be forthcoming, the decision I feel bound to pronounce is "a verdict for the plaintiff."—WM. EAGLE CLARKE, Leeds.

CUCKOO.—Cuckoos have occurred in this neighbourhood in greater numbers than I ever observed before. Three, five, and as many as seven have been seen together. Besides their ordinary call they have a laughing note, and when fighting can hiss like geese or snakes. Have they been more numerous than usual in other districts this year?—C. C. HANSON, West Vale, July 18th.

SINGULAR CONDUCT OF A COCK.—A common domestic hen, having a brood of twelve chickens, began to thrash them away, to provide for themselves, about two weeks ago. A cock—a cross between a Cochinchina and silver pheasant—struck the mother, called the chickens to him, and ever since has performed the office of guardian both night and day. I saw him this morning with nine brooding under his wings, and three sitting on his back.—C. C. H., July, 1879.

BREEDING OF THE LONG-EARED OWL AT RYTHER.—While staying for a few days at Ryther, in the neighbourhood of Bishop's Wood, I was informed that the long-eared owl had bred there last spring. The three young birds, which are known as the "horned owls," were taken from a wood on the estate occupied by Mr. Atkinson. They were found by his sons in the nest of a magpie during the month of May, and are now in the possession of Mr. Paver, of Leeds.—WALTER RAINE, Leeds, July 17th.

Gymnostomum commutatum IN WALES.—I beg to announce the discovery of *Gymnostomum commutatum*, Mitten, in a second locality in Wales. A few weeks back I had occasion to examine specimens of the moss from near Wrexham, re-discovered, I may say, by Mr. Holmes during last year, and was surprised to find in comparing specimens in my herbarium marked "*Gymnostomum curvirostrum*—wet rocks near Trefriw, N. Wales, June, 1861, Dr. Wood," that they agreed with Mitten's description, having the leaf cells nearly all elongated and pellucid.—JOHN WHITEHEAD, 21st July.

Plagiothecium Borrerianum, Spruce.—On looking over some mosses gathered at Whitsuntide (May 21), 1877, in the neighbourhood of Wetherby, I find a very fine specimen of the above moss in fruit, in the character of which it agrees in every respect with Mr. Whitehead's specimens from Barmouth, except that the seta is somewhat longer. The specimen was gathered in a wood near to Collingham, on the south bank of R. Wharfe.—C. P. HOBKIRK.

Hypnum imponens IN NEW FOREST.—Amongst a large parcel of mosses from the southern counties, recently sent to me by Mr. E. M. Holmes, F.L.S., I find a packet of *H. imponens*, gathered on Fritham Plain in the New Forest, Hants, and marked abundant, though without date. As I am not aware of this locality having been previously recorded, I think it as well to publish it, and should also be glad to hear whether it has been found in any other British localities besides this, Reigate Heath, Strensal Common, and Skipwith Common (vide *Nat.* III, 142).—C. P. H.

REVIEW.—“Outline Descriptions of British Coleoptera : by the Rev. T. Blackburn, B.A. London : E. W. Janson, 28, Museum Street, W.C.”—We are glad to see this reprint of a paper which has extended over the pages of the *Scottish Naturalist* for several years, as it is now in a handy form for coleopterists, to whom, and particularly to those who purpose beginning the study of the coleoptera (and of such there ought to be a number in our Union), it will be invaluable. The descriptions are in a brief and condensed form, but the abbreviations are clearly and thoroughly explained in the introduction, and a short time spent over these and the glossary will render the descriptions intelligible and easy to read. Unfortunately, Mr. Blackburn left our shores for Honolulu before completing the work, but he is now adding very extensively to our knowledge of the coleoptera of the Hawaiian Islands, and we must hope that ere long he will be able to find time and opportunity to finish his “Outlines” in the *Scottish Naturalist*.

Rainfall for June.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4·57	25	14·27	* 14·53	7	0·86
LEEDS ... (H. Crowther) ...	183	4·43	23	14·20	...	7	1·52
HALIFAX... (F. G. S. Rawson)	360	6·18	22	19·69	20·88	..	...
BARNSEY ... (T. Lister) ...	350	4·48	23	14·81	10·92	7	1·13
INGBIRCHWORTH (do.)	853	5·08	24	17·54	18·21	7	1·01
WENTWORTH CASTLE (do.)...	520	5·02	23	16·01	11·65	7	1·06
GOOLE ... (H. F. Parsons)	25	3·03	18	11·25	9·02	7	0·65

* This is the average to date for 13 years, 1866-78.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting July 8th, the president, Mr. T. Lister, in the chair.—The reports of the sectional meetings, prepared the evening before, were read, and specimens of the plants and insects were examined. Attention was called to the many interesting species of birds which may be observed when suitable localities are examined, as was done in the excursion to Edlington Woods, Roche Abbey, and Sandbeck Park, which were most successful in this respect.

BRADFORD NATURALISTS' SOCIETY.—Meeting June 24th, Mr. Firth in the chair.—Mr. C. C. Starling gave a paper on "The Sun." Mr. Richmond, the head gardener of Manningham Park, offered to convert a portion of the Park into a British Botanic Garden, if the Society would form a special committee to assist him in carrying out the project. The scheme was cheerfully adopted. A number of insects were shewn by Messrs. Firth, Carter, Cooper, and Crawshaw, including *L. salicata* (Shipley Glen), *A. menyanthidis*, *A. fuliginosa*, and *H. glauca*, from Hawksworth.

MEETING July 8th, Mr. Illingworth in the chair.—Mr. Spencer gave a full account of the plants already placed in the New Botanic Garden at Manningham, which shewed that the project was progressing very favourably as a large number of species were already planted. Messrs. J. Firth, J. W. Carter, B. Illingworth, Starling, Hopwood, and Terry, exhibited from the district *E. affinitata*, *M. ocellata*, *C. propugnata*, *E. decolorata*, *E. albulata*, *H. dentina*, *A. luteata*, *C. corylata*, *N. plecta*, *A. candidata*, *A. basilinea*, *B. rubi*, *A. betularia*, and *L. cœsiata*. Mr. Butterfield sent for exhibition *C. ferrugata*, *H. adusta*, *F. piniaria*, *E. lariciata*, collected at Wilsden, the latter three new to the district record list. Mr. J. A. Douglas, F.R.M.S., gave a lecture on "The Spectroscope and its applications."—WM. WEST, Sec.

DEWSBURY NATURALISTS' SOCIETY.—Annual meeting, June 6th, Dr. Robinson, president, in the chair.—The report of the past year (and first of the Society's existence) was read. The following were appointed officers for the ensuing year :—Dr. Robinson re-elected president ; Messrs. W. W. Yates, P. F. Lee, and John Wright, vice-presidents ; James Farnhill, treasurer ; and Henry Brearley, secretary.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting July 7th, Mr. J. E. Eastwood in the chair.—Messrs. B. Garside and A. Kippax exhibited a collection of land and marine British birds' eggs, and the latter gentleman a beautiful specimen of bird architecture, the nest of the long-tailed titmouse. Messrs. Hanson and Edwards named a goodly number of botanical specimens which were on the table. Mr. J. H.

Stott showed a collection of fossils, including ammonites, goniatites, and corals ; Mr. H. Davis, weapons of primitive man, flint arrow heads, &c. ; and Mr. G. Clayton, several interesting objects with the microscope.—
W. H. STOTT.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Meeting June 30th, the president, Mr. S. J. Capper, in the chair.—A paper was read, contributed by Mr. F. Buchanan White, M.D., F.L.S., on “The Mountain Lepidoptera Britain.” Groups such as these, specifically or generically identical over a whole zone, and restricted to an altitude and temperature which renders them peculiarly isolated, prove one of the principal difficulties in the acceptance of the theory of evolution, and this paper was specially directed to explain the present distribution of these species, their probable birthplace, and the route by which they arrived at their present habitats. Dr. White assumes on geological evidence that on the close of the last glacial epoch the bed of the German Ocean was elevated so as to form a land connection between England and the Continent sufficient for the immigration of such species from Central Europe, and that as the temperature became warmer, these forms were forced up isolated mountain ranges, partly in obedience to the requirements of their physical structure, and partly as a result of the greater competition for existence at lower altitudes. The usual conversazione terminated the meeting.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—339th meeting, June 24th, Mr. C. H. Bothamley, vice-president, in the chair.—Mr. Emsley showed fresh-water algæ of various species, and a hemipterous insect ; and Mr. W. H. Kirtlan, cuticles of *Araucaria imbricata*, aloe, leek, *Iris germanica*, *Sempervivum tectorum*, *Yucca gloriosa*, *Equisetum fluviatile*, *Ilex aquifolium*, *Crassula punctata*, epiderm of *Viburnum Lantana*, and leaf of *Rosmarina officinalis* and *Urtica urens*.

340TH MEETING, July 1st, Mr. Edwd. Atkinson, F.L.S., president, in the chair.—Mr. John W. Taylor exhibited *Pupa ringens* from Cayton Bay, near Scarborough, *Zonites excavatus* from Bramley Fall Wood, Leeds, *Helix arbustorum* from Castleford, *Cochlicopa tridens* vars. *crystallina* and *Nouletiana* from Ilkley. It was pointed out that the last-named variety is really the prevalent British form of that species, the type being comparatively rare. Mr. Charles Waterfall showed *Rosa pimpinellifolia* from shores of Esthwaite Lake, and *Thalictrum majus* and *T. Kochii* from shores of Windermere Lake ; Mr. H. Marsh, *Chelonia villica* from Hampshire, *Euplexia lucipara*, *Hepialus hectus*, *Coremia ferrugata*, *Iodis lactearia*, &c., from Adel ; Mr. James Abbot, a slide of algæ (desmids, &c.) from a prolific pond at Bramhope ; Mr. W. Barwell Turner, F.C.S., slides of marine annelids ; pupæ of *Ephemera vulgata* ; fructification of *Chara* ; *Ulva crispa* ; and parasitic fresh-water algæ on moss and *Myriophyllum*.

341ST MEETING, July 8th.—Mr. Thomas Hick, B.A., B.Sc., showed *Hymenophyllum unilaterale*, *Bartramia fontana*, *B. ithyphylla*, *Hookeria lucens*, and *Trientalis europæa* from Ravensgill, Pateley Bridge. Birds' eggs were exhibited by Mr. Walter Raine. Messrs. Tyers and A. Denny showed a number of lepidoptera taken near Thorner, including *Melanthia albicillata*, *Thanaos Tages*, *Pamphila sylvanus*, &c., and several insects from Meanwood; Mr. Smethurst, *M. albicillata* and *M. tristata* from Wharnccliffe Wood, and a number of other recent captures; Mr. Henry Marsh, insects from Grange, including *Leucophasia sinapis*, *Lycaena Salmacis*, *Cænonympha Davus*, *Nemoria viridata*, *Venila maculata*, *Cidaria corylata*, *Aspilates strigillaria*, &c., also a number taken at Adel, including *Eupithecia lariciata*, *E. plumbeolata*, *E. pulchellata*, and *E. vulgata*. The Leeds Catalogue of Lepidoptera was then proceeded with as far as the end of the geometers.

342ND MEETING, July 15th, the president in the chair.—Mr. E. Thompson exhibited a copy of Baker's "Microscope made easy," dated 1742; Mr. W. B. Turner, F.C.S., showed polarised objects:—scales of eel, lepidosteus, roach, and perch; skin of grey mullet, mackerel, dog-fish, sole, loach, trout, and bullhead; Mr. F. Emsley, a collection of fresh-water algæ, desmids, diatoms, &c., from Wortley, near Leeds, also mounted slides of *Daphnia* and *Hymenophyllum unilaterale*; Mr. James Abbot, living shrimps and marine algæ (*Ulva* and *Enteromorpha*) in growth. The botanists of the Club held a meeting this evening, at which they decided to form a Botanical Section, of which Mr. James Abbott was elected president. He showed *Astragalus hypoglottis*, *Carex arenaria*, *Hordeum pratense*, and other plants, all from Redcar; Mr. J. R. Murdoch, some plants collected among the Breadalbane mountains, Perthshire, including *Hymenophyllum Wilsoni*, *Cystopteris fragilis*, and *Polypodium Phegopteris*; *Hypnum splendens*, *H. triquetrum*, *H. cuspidatum*, *H. stellatum*, *H. uncinatum*, *Bartramia pomiformis*—all in fruit, and *B. arcuata*; *Cladonia rangiferina*, *C. Cervicornis*, *Parmelia caperata*, *Sticta pulmonacea*, and *Lecanora tartarea*.—W. D. R.

YORKSHIRE NATURALISTS' UNION.—The fourth meeting for 1879 was held at Hebden Bridge, and was devoted to an examination of the Hebden and Crimsworth valleys. The weather was thoroughly unpropitious, thus for once falsifying the luck by which the Union is nearly invariably favoured by fine weather. The meetings were held at the White Horse Hotel, Hebden Bridge. There was a very large number of members, comprising over 100 representatives from 17 societies. The chair was occupied by the Rev. W. Fowler, M.A., Liversedge, vice-president. The list of new subscribers, to whom thanks were voted, included Messrs. J. H. Rowntree and F. Bainbridge of Scarborough, James Backhouse of York, Dr. W. Alexander, J.P., of Halifax, and Rev. W. C. Hey of Guisborough. On the motion of Dr. Alexander, thanks

were voted to the local secretary, Mr. C. P. Hobkirk, F.L.S., of Huddersfield; also to Mr. Lipscombe for permission to ramble through the woods. Messrs. Thomas Lister of Barnsley, and George Brook, ter., F.L.S., of Huddersfield, were chosen to represent the Union, along with Mr. Hobkirk, at the British Association Meeting at Sheffield. Before taking the reports of Sections the chairman, in a few appropriate and well-chosen words, referred to the loss which the Union had sustained by the removal from Yorkshire of Dr. Parsons, who had accepted a position under the Local Government Board in London. On considering in what manner the great services he has rendered to the Union should be recognised, the suggestions offered were allowed to stand over for further consideration. The reports of Sections were then taken. Mr. William West, Bradford, secretary of the Botanical Section, reported that a fair number of plants had been seen, considering that the botanists had to alternately shelter and botanise under cover of an umbrella. 189 vascular plants had been observed, the rarest of which were *Lathræa squamaria*, *Paris quadrifolia*, *Oenanthe crocata*, and *Iris Pseud-acorus*, from Luddenden Dene; *Scutellaria minor* from Midgeley Moor; *Melica nutans*, *Crepis paludosa*, *Corydalis claviculata*, *Rubus suberectus*, *Jasione montana*, *Carex remota*, *C. pilulifera*, *Vaccinium Oxycoccos*, *Polypodium Dryopteris*, and *P. Phegopteris*, from the Hebden valley. About fifty mosses were observed, including *Neckera crispa*, *Fontinalis squamaosa*, *Atrichum crispum*, *Dicranella squarrosa*, *Dicranum fuscescens*, *D. majus*, *Bartramia pomiformis*, *Leptobryum pyriforme*, and *Hyocomium flagellare*. Eleven species of lichens were observed, including *Sphærophoron coralloides*, *Cetraria aculeata*, and *Peltigera canina* (fr.); and ten hepaticæ, including *Jungermannia barbata*. Six species of fungi were all that were noticed, including *Uredo Potentillarum* on *Alchemilla vulgaris*. Prof. A. H. Green, M.A., F.G.S., president of the Geological Section, was present during the day, but was compelled to leave before the meeting. Mr. Spencer, the secretary, read the report. Want of time prevented the giving of further reports, which however would otherwise have been given as follows:—by Mr. W. E. Clarke, Leeds, secretary of the Vertebrate Section; and by Mr. S. D. Bairstow, secretary of the Entomological Section, including the following beetles reported by Mr. E. B. Wrigglesworth, of Wakefield:—*Telephorus abdominalis*, *Timarcha coriaria*, *Otiorhynchus picipes*, *O. atro-apterus*, *Phyllobius alneti*, *P. viridicollis*, and *Barynotus mœreus*.—W. D. R.

[N.B.—We much regret that, owing to the late date in the month when this meeting was held, and consequently the late period at which some of the reports of the Sections reached us, we have been compelled to either curtail or altogether omit them. Some of the local Societies' reports, on account of late arrival, we have also been obliged to treat in the same manner.—Eds. Nat.]

Diary.—Meetings of Societies.

- Aug. 4. Yorkshire Naturalists' Union—Excursion to Doncaster for Edlington Wood, &c.—Meetings and tea at Reindeer Hotel, 4 p.m.—Local Secretary, Thos. Birks, Jun., Old Mill, Goole.
- „ 5. Liversedge Naturalists'. Leeds Naturalists', &c., Entomological Section.
- „ 6. Wakefield Naturalists'.
- „ 8. Huddersfield Scientific Club.
- „ 11. Manchester Cryptogamic Society.
- „ 12. Leeds Naturalists', Microscopical Section.
- „ 13. York and District Field Naturalists'.
- „ 19. Leeds Naturalists', Vertebrate Section.
- „ 21. North Staffordshire Naturalists' Field Club—Excursion. Dewsbury Naturalists'.
- „ 25. Lancashire and Cheshire Entomological.
- „ 26. Leeds Naturalists'—General Meeting.

CATALOGUE OF YORKSHIRE BIRDS.

The compiler tenders his thanks to those who have responded to his request for information as to the *Accipitres*, and would now be glad to receive similar lists with remarks as to the distribution, abundance, breeding and rare occurrences of the first portion of the *Insessores*, comprising the families *Laniidæ*, *Muscicapidæ*, *Cinclidæ*, *Turdidæ*, *Sylviadæ*, *Troglodytidæ*, *Paridæ*, and *Ampelidæ*, (Shrikes, Flycatchers, Dipper, Thrushes, Orioles, Accentors, Robins, Redstarts, Chats, Warblers, Wrens, Tits, and Waxwing). All assistance will be duly acknowledged by W.W. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

EXCHANGE.

Sparrow-hawk, Green Woodpecker, Red Grouse, Waterhens, &c., in separate cases, for which I should be glad to receive yearly volumes of "Science Gossip," bound or unbound (except 1877 and 1878—or offers.—J. R. MURDOCK, 40, Leighton Lane, Leeds.

Mr. J. R. MURDOCK having undertaken to arrange a collection of Yorkshire Mosses for the Leeds Naturalists' Herbarium, would be glad of the assistance of any bryologists who may feel disposed to contribute good specimens of mosses gathered in Yorkshire.—Address 40, Leighton Lane, Leeds.

WANTED.

Wanted a complete set (unbound) of the first four volumes of "The Naturalist" (new series).—WM. DENISON ROEBUCK, Sunny Bank, Leeds.

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No. L.

SEPTEMBER, 1879.

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Original Articles.

LIST OF MOSSES OCCURRING NEAR WETHERBY,

IN THE VICE-COUNTY OF MID-WEST YORK.

OBSERVED BY J. S. WESLEY, M.B., LOND.

THE following list includes no species but what occur within four miles from Wetherby. The country about Wetherby is gently undulated, well wooded, and has the two rivers Nidd and Wharfe running through it. The underlying rocks are mainly magnesian limestone and the sandstone known as Plumpton grit. Fine perpendicular cliffs of limestone margin the Wharfe on its south side below Wetherby. The disused quarries north and west of Wetherby have hitherto produced the greatest number of good species.

The chief value of this list, in the opinion of Mr. Lees, will probably be found to depend not so much on the great rarity of any of the species given, nor upon any great interest attaching to the several localities, as upon the fact that the records are unusually reliable—nearly, if not all, having been verified by such competent authorities as Messrs. Boswell, Braithwaite, and Fergusson, through specimens submitted to them for verification.

Further, after four seasons' careful examination of a district thoroughly familiar to me, the list may be regarded as almost complete for the limited area of which it treats, with the exception that some of the smaller mosses probably growing here have not yet been detected.

I may add that the claim to inclusion in the W. R. flora of the following species, viz., *Pottia intermedia*, Turn.; *Didymodon cylindricus*, Bruch.; *Fissidens viridulus*, Wils.*; *Thuidium abietinum*, L.; and *Hypnum Sendtneri*, Schpr., rests solely on Wetherby district localities.

Sphagnum acutifolium, Ehrh.

S. cymbifolium, Ehrh.

Weissia viridula, Brid.

W. cirrhata, Hedw.

Dichodontium pellucidum, L.

Dicranella varia, Hedw.

D. heteromalla, Hedw.

Dicranum scoparium, L.

Campylopus pyriformis, Brid.

Phascum cuspidatum, Schreb.

P. rectum, Sm.

Pottia minutula, Schwg.

P. truncata, L.

P. intermedia, Turn.

P. lanceolata, Dicks.

Didymodon rubellus, B. & S.

D. luridus, Hornsch.

D. cylindricus, Bruch.

* This species was gathered by the late John Nowell many years ago, in the neighbourhood of Pontefract.—[*Eds. Nat.*]

N. S., VOL. V., SEPT., 1879.

- Ditrichum flexicaule*, Schwg.
Trichostomum tophaceum, Brid.
Barbula ambigua, B. & S.
B. muralis, L.
B. unguiculata, Dill.
B. fallax, Hedw.
B. recurvifolia, Schpr. (male plant only).
B. rigidula, Dicks.
B. spadicea, Mitt.
B. convoluta, Hedw.
B. subulata, L.
B. intermedia, Brid.
Ceratodon purpureus, L.
Encalypta vulgaris, Hedw.
E. streptocarpa, Hedw.
Grimmia apocarpa, L.
G. pulvinata, L.
Ulota intermedia, Schpr.
Orthotrichum saxatile, Brid.
O. affine, Schrad.
O. diaphanum, Schrad.
Physcomitrium pyriforme, L.
Funaria hygrometrica, L.
Leptobryum pyriforme, L.
Webera annotina, Hedw. B. Bank,
in quarry s.w. of K. Deighton
(F. A. Lees)
W. albicans, Wahl.
B. caespitium, L.
B. argenteum, L.
B. capillare, L.
Bryum pallens, Swartz.
B. pseudotriquetrum, Hedw.
Mnium undulatum, Hedw.
M. hornum, L.
M. serratum, Schrad.
M. punctatum, Hedw.
Aulacomnium androgynum, L.
A. palustre, L.
Tetraphis pellucida, L.
Atrichum undulatum, L.
Pogonatum aloides, Hedw.
P. urnigerum, L.
Polytrichum piliferum, Schreb.
P. commune, L.
- Fissidens bryoides*, Hedw.
F. exilis, Hedw.
F. incurvus, Schwg.
F. viridulus, Wils.
F. adiantoides, Hedw.
F. taxifolius, L.
Cinclidotus fontinaloides, Hedw.
Fontinalis antipyretica, L.
Leucodon sciuroides, L.
Neckera crispa, L.
N. complanata, L.
Homalia trichomanoides, Schreb.
Leskea polycarpa, Ehrh.
Anomodon viticulosus, L.
Thuidium tamariscinum, Hedw.
T. abietinum, L.
Cylindrothecium concinnum, De Not.
Thamnum alopecurum, L.
Climacium dendroides, L.
Isothecium myurum, Poll.
Homalothecium sericeum, L.
Campthothecium lutescens, Huds.
C. nitens, Schreb.
Brachythecium glareosum, B. & S.
B. quarry, Kirk Deighton (F. A. Lees)
B. velutinum, L.
B. rutabulum, L.
B. rivulare, B. & S.
B. populeum, Hedw.
B. plumosum, Swartz.
Eurynchium myosuroides, L.
E. striatum, Schreb.
E. piliferum, Schreb.
E. Swartzii, Turn.
E. praelongum, Dill.
Rhynchostegium tenellum, Dicks.
R. confertum, Dicks.
R. murale, Hedw.
R. rusciforme, Weiss.
Plagiothecium denticulatum, L.
P. Borrerianum, Spruce (*elegans*, Auct., non Hook.)
P. undulatum, L.

Amblystegum serpens, L. L. S.	Hypnum arcuatum, Lindb.
Common both in the small	H. molluscum, Hedw.
form and in the large one, so	H. palustre, L.
often mistaken for radicale,	H. chrysophyllum, Brid.
Beauv.	H. stellatum, Schreb.
A. riparium, L.	H. cordifolium, Hedw.
Hypnum Sendtneri, Schpr.	H. cuspidatum, L.
H. filicinum, L.	H. Schreberi, Ehrh.
H. commutatum, Hedw.	H. purum, L.
H. falcatum, Brid.	Hylocomium splendens, Hedw.
H. cupressiforme, L. Common	H. squarrosum, L.
both in its ordinary state and	H. loreum, L.
in the form resupinatum, Wils.	H. triquetrum, L.

A COLLECTING TOUR IN NORTH YORKSHIRE.

BY H. POLLARD.

EARLY in the present summer we set out on a Natural History collecting tour in the north of Yorkshire. As a convenient starting-point Whitby was chosen, with the intention of extending the work which has already been done there.

On the morning after our arrival we began early in excellent spirits our work of collecting, which we continued vigorously and successfully the whole of the time we remained in this locality. As it is of but little use to enumerate the whole of the shells and beetles we took here, many of them being mentioned by Mr. Crowther in his article on "Whitby," we will only give those which are additional.

In land and fresh-water shells we collected *Bulimus obscurus* and its variety *alba*; this last is very rare, and occurred but sparingly. In a ditch near Larpool fine elongated specimens of *Limnæa truncatula* were taken. Another shell worthy of notice from its peculiar shape, was *Limnæa peregra*, taken near the small but picturesque village of Ruswarp. *Helix nemoralis* var. *hortensis* appeared in profuse numbers, and with it were found several splendid specimens of the variety *hybrida*.

In marine conchology we took, on the scar at Saltwick and at a distance of about two hundred yards from the shore, specimens of *Tapes pullastra*; they were very dwarfed in size, and attached to the rocks. Other beautiful shells found here were *Tectura testudinalis* and *Trochus helycinus*. Respecting the former, in the article already cited mention has been made of its probable occurrence at Robin Hood's

Bay; as the place where we gathered it is about a mile and a quarter south of the author's hunting ground, we are led to believe his surmise may be true.

In coleoptera we took at Whitby *Liophlæus nubilus*, Fab., *Amara communis*, Panz., *Harpalus rubripes*, Duft., *Otiorhynchus picipes*, Fab., *Diacanthus holosericeus*, Fab., *Notiophilus biguttatus*, Fab., *Aphodius fimetarius*, L., *Sitones lineatus*, L., *S. regensteiniensis*, Hbst., *Olibrus ænus*, Fab., *Bembidium laterale*, Oliv., *Telephorus lividus*, L., *Clivina fossor*, *Athoüs longicollis*, Oliv., *Stomis pumicatus*, Penz., *Phyllobius argentatus*, Fab., *Liosumus ovatulus*, Clairv., *Silpha atrata*, L., *Phyllobius Pomonæ*, Oliv., and *Aphodius testudinarius*.

At Stakesby, *Phyllobius alneti*, Fab., *P. pyri*, L., and *Liosumus ovatulus*, Cl., were taken.

At Bluebank, near Sleights: *Agabus fontinalis*, Steph., *Prasocuris aucta*, Fab., and one freshwater shell, *Limnæa peregra*.

At Sleights: *Chrysomela polita*, L., *C. staphylæa*, L., *Pyrochroa rubens*, Fab., *Otiorhynchus picipes*, Fab., *O. scabrosus*, *Anchomenus albipes*, Fab., *Telephorus testaceus*, *Corymbites holosericeus*, Fab., and *Agriotes sputator*, Fab.

At Aislaby: *Tachinus rufipes*, Fab., *Stenus canaliculatus*, Gyll., *Philonthus laminatus*, Creutz., *Lathrobium fulvipenne*, Gr., *Xantholirius punctulatus*, Payk., *Philonthus varius*, Gyll., *Stomis pumicatus*, Panz., *Loricera pilicornis*, Fab., and in molluscs *Zonites alliarius*.

At Ruswarp: *Silpha lævigata*, Fab.

At Egton Bridge: *Zonites cellarius*, *Z. nitidulus*, and one beetle, *Clivina fossor*.

At Lealholme, *Limnæa truncatula*.

At Danby: *Notiophilus palustris*, Duft., *Anchomenus albipes*, Fab., *Liosumus ovatulus*, Cl., and *Leistus ferrugineus*, L.

At Castleton: *Byrrhus murinus*, Fab., *Clivina fossor*, *Phyllobius alneti*, Fab., *Bembidium laterale*, *Othius pilicornis*, *Anchomenus albipes*, Fab., and *Phyllobius argentatus*, L.

We next proceeded to Southbank, near Middlesborough, where we stayed better than a week. As a rule, in collecting here we were very unsuccessful, the geology of the district being quite against us. We, however, obtained the following shells:—*Planorbis albus*, *P. vortex*, *L. peregra*, *Z. nitidulus*, *Cochlicopa lubrica*, and *Pupa umbilicata*. Amongst the *Limnæa peregra*, specimens taken in the reservoir of Messrs. Bolckow Vaughan and Co., ironworks are worthy of special notice, on account of their very elegant form. In colour they are black.

Searching at Normanby (about two-and-a-half miles from South-bank), we took *L. peregra* in a ditch which ran through the middle of a meadow. They were thickly coated with a confervoid growth.

In coleoptera we collected *Gyrinus bicolor*, Payk., *Laccophilus ayalinus*, D., *Byrrhus pilula*, L., and *Agriotis sputator*.

By a run over to the fast-rising watering-place of Saltburn we were well rewarded. We took the common heart sea urchin in large quantities. On the ebbing of the tide, the beach, to use an hyperbolic phrase, was covered with them.

In mollusca we obtained the following:—*Macha stultorum*, *Donax politum*, *Telina tenuis*, *T. fabula*, *Trochus cinereus*, *Littorina obtusata*, *L. littorea*, *Solen siliqua*, *Helcion pellucida* and its variety *lævis*, *Cardium edule*, and *Patella vulgata*.

In a stream of brackish water, at a few yards above high-water mark, we collected very large specimens of *L. peregra*, covered with a confervoid growth. The only land-shell taken was *Cochlicopa lubrica*, under old wood near the coast.

On resuming our tour south to Masham, a break in our journey at Melmerby for almost an hour enabled us to gather *Helix cantiana* and *H. nemoralis* var. *hortensis*. Arrived at Masham, we at once began our work. In a pond situated about half-a-mile from the town we took some of the finest specimens of *Limnæa stagnalis* and *L. palustris* it has ever been our pleasure to view; in numbers they outstripped any locality we have collected in. At one dip of the net more than once eight or nine were brought up. Also from the same pond, but in less quantities, were taken *Planorbis corneus*, *P. carinatus*, *Bythinia tentaculata*, and *L. peregra*.

In the river Burn, a tributary of the Ure, *Ancylus fluviatilis* was found very commonly adhering to stones. Examining a ditch a few yards from the river, we discovered *Succinea putris* and its variety *solidula*, *S. elegans*, and *Limnæa truncatula*, the last-mentioned being very long. *L. peregra* was also taken here and in three or four other ditches round Masham, but varied very much in shape and appearance in each. In one the specimens had reflected lips. *Clausilia rugosa* was taken very profusely among moss on old and decaying walls. Amongst the crevices of one, nothing but the variety *dubia* was found. *C. rugosa* var. *tumidula* was also present in several places.

The most commonly occurring shell in this district is without doubt *Helix nemoralis*, var. *hortensis* varying as much as plain yellow, flesh colour and dark bands, often five in number could make them. The varieties *hybrida* and *minor* of *H. nemoralis* were also abundant. With

one exception all the former obtained, numbering about thirty, were flesh-coloured.

Though both the above varieties of *H. nemoralis* were so common, yet the type shell was not observed. The circumstance of *H. nemoralis* being absent, and the variety *hybrida* occurring, strengthens our opinion as to what we consider the latter to be, viz., simply a variety of *hortensis*.

We were surprised, on reaching home, to learn from the Doncaster circular of the Union meeting that variations in form and colour of *Helix nemoralis* were quite overlooked by local collectors—a speciality of this ever-varying shell being made, to our certain knowledge, by many Yorkshire conchologists.

Other shells taken in and around Masham were—*Pupa umbilicata*, *C. lubrica*, *H. hispida*, *H. hispida* var. *albida*, *Helix rufescens*, *Z. cellarius*, *Z. alliarius*, *Z. cellarius*, var. *alba*, *Z. nitidulus*, and *Helix rotundata*.

In coleoptera we took *C. polita*, *Hybrius uliginosus*, L., *Tel. lividus*, *Pyrochroa rubens*, Fab., *Stomis pumicatus*, Panz., *Anchomenus albipes*, Fab., *Leistus ferrugineus*, L., and *L. rufescens*, Fab.

At Ellington, about two-and-a-half miles from Masham, *Helix lapicida*, *C. rugosa*, *C. lubrica*, *P. umbilicata*, and *Helix hortensis* were taken; and at Ellingstring, about five miles distant, *Sphaerium lacustre*.

From Masham we made our way home, after having spent a very pleasant and profitable holiday, fully satisfied that we had done something at least towards the extension of the Natural History of our county. We find that *Olivina fossor* is pretty well distributed, and that many of the coleoptera common in the Leeds district occur equally plentifully in the tract of country we have traversed. In conchology we claim to be the first recorders of *Bulimus obscurus* var. *alba* in Yorkshire.

Philosophical Hall, Leeds,

Aug. 17th, 1879.

Short Notes and Queries.

Exorista hortulana, MGN.—In the July number of the *Naturalist* I described a male of this fly which was bred by Mr. Porritt from a larva of *Acronycta alni*. Having lately had the pleasure of receiving from Mr. Mosley a second specimen of this insect (bred from the same larva), which fortunately was a female, I am now enabled to complete the description of the species. I am especially glad to do this, as the female was unknown

to Meigen, and differs so considerably from the male, that it might easily be described as a distinct species, and even be placed in a different genus. The chief points of distinction between the sexes are these :—1st. The eyes in the female are only very slightly pubescent, while they are decidedly hairy in the male. 2nd. The palpi in female are of a dark piceous colour at their extremities, while they are yellow in the male. Besides these two special points of difference, the apex and free edge of the scutellum have a yellowish-red tinge in the female, which can be scarcely seen in the male, except in a very strong light. The frontal space (as is usual in these flies) is wider in the female than in the male, occupying in the former about one-third of the width of the head. In all other points of colour and structure the two sexes resemble each other. In conclusion, I beg to return my thanks to Mr. Mosley, as well as to Mr. Porritt, for placing these specimens at my disposal.—R. H. MEADE, Bradford, July 19.

OCCURRENCE OF *Boletobia fuliginaria*.—One of our men has just brought me a female *Boletobia fuliginaria*, which he caught on the wharf. In getting it into a box he unfortunately damaged the right side upper wing, but in other respects it is perfect. A male specimen was taken on the same premises about twenty years ago, and is still in the captor's cabinet.—J. R. WELLMAN, London, Aug. 15th.

UNUSUAL NESTING-PLACE OF WHEATEAR.—During an ornithological ramble to Adel last spring, I obtained eggs of a wheatear from a hole in a bank which overhangs one of our beautiful streams. The hole was once the nesting-place of the sand martin. The nest was placed at the far end of the hole, which was about 3ft. in length. I only know of another similar instance on record, and that is given by the Rev. F. O. Morris in his work on the nests and eggs of British birds. I also procured eggs of the dipper, from a boy who had found them near the same stream a few days previously. He discovered the old bird on the nest, and took bird, nest, and the five eggs. He kept the bird in a cage for some time, but being unable to procure food for it, he was persuaded to let it go; and not knowing the value of the nest, he destroyed it. The dipper's nest and eggs are seldom found in this neighbourhood.—WALTER RAINE, Leeds, Aug. 18th.

THE CUCKOO.—In last month's *Naturalist* (vol. v., p. 11,) Mr. Hanson states that "during the present year cuckoos have occurred in greater numbers than he has ever observed before," and asks if the same has been noticed in other districts. My brother and I have observed the same in this district, and consider it a rare and unusual occurrence. I have several times seen two, three, and once saw four together, but have never seen so many as seven. The cuckoo does not pair, and it is unusual to see even male and female together. If two males meet in the course of their wanderings, they frequently fight with intense animosity. I once heard a cuckoo sing while flying, and noted it down as a very unusual occurrence. I found several eggs of the cuckoo last spring, and

judging from the situation of the nest, I should say it was impossible for the cuckoo to have laid her egg in the nest ; she, therefore, must have laid it on the ground and then carried it to the nest in her bill. I have found both the eggs and young of this bird in pipits' nests, within a few yards of each other. I find that incubation lasts about fourteen days, and the young bird is able to fly within a month. I also noticed the nestling had a low plaintive chirp. It was very interesting to watch the foster-parents feed the young monster. I have a fine series of the cuckoo's eggs in my collection, and find they differ considerably both in ground colour and markings. One which I took from a meadow pipit's nest is similar to the skylark's, while another taken from a hedge sparrow's is similar to the dark variety of the pied wagtail.—W. RAINE.

MICROSCOPIC ORGANISMS AT BRAMHOPE.—Mr. Jas. Abbott has reported to the Leeds Naturalists' Club that a gathering made at a prolific pond at Bramhope, near Leeds, contained the following organisms :—*Edogonium tumidulum*, *Æ. vesicatum*, *Spirogyra nitida*, *Oscillatoria*, *Ulothrix mucosa*, *Hyalotheca dissiliens*, *Staurostrum furcigerum*, *Arthrodesmus confluens*, *Cosmarium margaritiferrum*, *Epithemia turgida*, *Pandorina morum*, *Volvox globator* and *Ophiocytium majus*.

CONCHOLOGICAL NOTES FROM NORTH WALES.—I wish to make the following observations on the Molluscan fauna of that part of N. Wales in which I have been staying for the last few weeks ; they include the following from Cadnant, a thickly wooded dell, running inland from the Beaumaris road, about a quarter of a mile from Menai Bridge : *H. hispida* and *sericea*, occurred commonly, *H. aculeata*, *V. pellucidum*, rarely ; *Z. fulvus*, *Z. cellarius*, *Z. alliarius*, *Z. nitidulus*, commonly ; *C. rugosa*, and var. *tumidula*, also *C. minimum*. From the river Cadnant were taken, *A. fluvialis*, common and large, approaching in form to *gibbosa*, and *S. putris*. In a prolific pond near Treborth station, *P. hypnorum*, the finest specimens we have ever yet seen, many being suspended by molluscan threads when taken. *L. peregra*, and one specimen of var. *picta*, in a ditch on the Llanfair road. From Llangefni river, *P. albus*, *vortex* and *spirorbis*, beneath the leaves of the water lily. *V. piscinalis*, common on the supports of the bridge ; *H. arbustorum* occurred but rarely on the river bank. At Tro-sy-Canol, a farm near Menai Bridge, amongst the decayed grass were found, *Z. cellarius*, and the var. *albida*, *Z. alliarius*, *C. lubrica*, common, having a very dark rich brown colour, with an occasional specimen of var. *hyalina*, *L. peregra*, var. *ovata*, and *L. palustris*, common. In the ditch on the roadside at Ty-Mahr, *H. rotundata* and *H. nemoralis* are found in large numbers at Menai Bridge. Amongst the stones in the disused marble quarries at Point Lynas, *H. aspersa*, *H. virgata*, and *H. caperata* were found, but not in any number. *H. caperata* and var. *ornata* are common on the rocks of the island of Llandisilw. *P. marginata*, common in the ruins of the old mill, Befellgod valley.—S. H. HIRST, Headingley, Aug. 16th.

NOTICES OF BOOKS, &c.—“HEPATICÆ BRITANNICÆ EXSICCATÆ,” Fasc. II.—We are glad to announce the appearance of this exsiccata, containing Nos. 76 to 150. The names of Messrs. Benj. Carrington, M.D., F.R.S.E., and Wm. H. Pearson, its authors, are quite sufficient to recommend it. Applications and communications should be made to Dr. Carrington, Eccles, or Mr. Pearson, 115, Church-street, Pendleton.

Rainfall for July.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 3·23	20	17·50	* 17·20	13	0·46
LEEDS ... (H. Crowther) ...	183	3·02	22	...	...	19	0·50
HALIFAX... (F. G. S. Rawson)	360	5·70	19	25·39	22·25	·	...
BARNSELY ... (T. Lister) ...	350	3·64	21	18·45	11·96	12	0·72
INGBIRCHWORTH (do.)	853	5·14	20	22·68	19·44	8	0·63
WENTWORTH CASTLE (do.)...	520	3·83	18	19·84	12·64	13	0·72
GOOLE ...	25	4·14	20	15·39	10·45	19	0·96

* This is the average to date for 13 years, 1866-78.

Reports of Societies.

THE BRITISH ASSOCIATION AT SHEFFIELD.

THE 49th annual meeting was opened on the 20th August, under the presidency of Dr. Allman, F.R.S., &c. Amongst the distinguished *savans* present were the ex-president, William Spottiswoode, Sir John Lubbock, Prof. Huxley, Prof. Williamson (Owen's Coll.), Prof. P. M. Duncan, Dr. Evans, Comm. Cameron, R.N., Prof. Newton, of Yale College, Conn., Clements R. Markham, Major Serpa Pinto, Dr. H. C. Sorby, &c., &c.

The President's Address was devoted chiefly to a discussion of the lower forms of life, commencing with a history and definition of the terms *sarcode* and *protoplasm*, passing from Huxley's *Bathybius* upwards through the *Protamæba* (MONERA), the *Amæba*, the condition of the egg, the spectroscopic relations of chlorophyll, &c. “When, however, we say that life is a property of protoplasm, we assert as much as we are justified in doing. Here we stand upon the boundary between life in its proper conception, as a group of phenomena having irritability as their common bond, and that other and higher group of phenomena we designate as consciousness or thought, and which, however intimately connected with those of life, are yet essentially distinct from them.” The concluding paragraph is well worthy of quotation : — “We are not, however, on that

account, forced to the conclusion that there is nothing in the universe but matter and force. The simplest physical law is absolutely inconceivable by the highest of brutes, and no one would be justified in assuming that man had already attained the limits of his powers.....mind, as well as body, is thus travelling onwards through higher and still higher phases. The great law of Evolution is shaping the destiny of our race; and though now we may at most but indicate some weak point in the generalization which would refer consciousness, as well as life, to a common material source, who can say that in the far-off future there may not yet be evolved other and higher faculties from which light may stream in upon the darkness, and reveal to man the great mystery of Thought?"

BARNSELY NATURALISTS' SOCIETY.—Meeting Aug. 5th, the president, Mr. T. Lister in the chair.—Many of the rare plants collected during the Yorkshire Naturalists' excursion to Doncaster the previous day were on the table. The absence of song birds about Barnsley up to the first week of July was noted; most of the warblers, however, have since been heard, including the nightingale, the garden warbler, blackcap, grasshopper warbler, sedge warbler, &c., not only in the extended excursions, but in the richly wooded districts about Barnsley. All four of the swallow tribe have been numerous, though the swift had been scarcely noted near the town. Starlings, grey and green linnets, and lesser redpoles, have been seen in numerous flocks since the breeding time, though rarely noted before. Blackbirds, thrushes, and skylarks are yet scarce, consequently gardeners and agriculturalists have found a difference in the over-abundance of worms, grubs, snails and other vermin. The wood warbler was heard to the middle of July. The willow warbler resumed its pleasing strain at the present date (Aug. 6th). Mr. C. Wemyss, of Cannon Hall, reported on July 23rd the great snipe near the cascade there, also cuckoos and sandpipers on the moors, where several flights of gulls were observed. He has since observed the goat sucker (rare this year), and a great snipe was shot on the moors on the 12th August. Lapwings have appeared in large flocks in the Dearne valley, on the grounds so frequently flooded.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 22nd, Mr. Firth in the chair.—Mr. J. Hebblethwaite gave a paper on "Gardening, and the Tulip Mania." Mr. Spencer recorded over 100 plants which had been brought to the botanic garden since the last meeting. Mr. Gilliver showed a collection of shells; Messrs. Butterfield of Wilsden sent for exhibition *Y. impluviata*, *N. dictæoides*, and *M. liturata*—the two latter from Bingley, and new to the district record list. Mr. J. W. Carter exhibited *A. leporina* and *C. russata* from Hawksworth, also new to the district record list.

MEETING August 5th, Mr. Firth in the chair.—Mr. J. Saville read a paper entitled "Notes on Natural History." Many plants, insects, and minerals were laid on the table for examination.—WM. WEST, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Meeting Aug. 4th, the president in the chair. There was a good collection of plants, named by Mr. C. C. Hanson, amongst which were the following :—*Lycopus europæus*, *Stachys sylvatica*, *Silene inflata*, *Scutellaria galericulata*, *Stellaria uliginosa*, and a *Carex*. Mr. F. Lumb showed eggs of snipe and willow wren.—W. H. STOTT.

GOOLE SCIENTIFIC SOCIETY.—Excursion June 14th, to Broughton Woods.—These woods are four miles from Appleby station, down the old Roman road called Ermine-street, and lie on the eastern slope of the ridge of oolite which forms the second of the three ranges of the Lincolnshire hills. A quarry of cornbrash containing *Rhynchonella spinosa*, and other characteristic fossils, was examined near Appleby station ; and in the quarry of inferior oolite named Read's Quarry, near Broughton, many good fossils were found. The flora of the neighbourhood is chiefly composed of dry limestone species, but some notable exceptions were met with during the day in the occurrence of one or two somewhat rare northern and southern species. The lateness of the season made the list of flowering plants less than might have been expected, but 170 species were seen, the most noteworthy being *Viola hirta*, *Silene noctiflora*, *Astragalus hypoglottis*, *Anemone Pulsatilla*, *Hippocrepis comosa*, *Spiræa filipendula*, *Inula Conyza*, *Lactuca muralis*, *Campanula Trachelium*, *Echium vulgare*, *Rubus saxatilis*, *Ophrys muscifera*. These woods are especially famous for the abundance of the lily of the valley (*Convallaria majalis*), which covers the ground for many acres, and generally blooms freely. Twenty-three mosses were seen, also some lichens and fungi. Moths and butterflies were abundant, but collectors were absent, and few captures were made. The nightingale was heard during the walk down Ermine-street, and 30 other birds were noted by Mr. A. Kell of Barnsley, and the Society's recorders, among them being the blackheaded gull (at Frodingham Warren), sand martin, wood warbler, blackcap warbler, gold-crested wren (nest and seven eggs), yellow-hammer, chaffinch, marsh tit, jay, whinchat, ringdove, &c.—THOMAS BIRKS, JUN., Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting August 8th, Mr. S. L. Mosley, vice-president, in the chair.—The chairman showed a pair of a beautiful variety of *Arctia menthastri*, taken by himself at Wharnccliffe ; also, on behalf of Mr. S. D. Bairstow, the following neuroptera :—*Agrion minium*, *Calopteryx splendens* (three forms), *Cordulegaster annulatus*, *Libellula quadrimaculata*, and *L. depressa*. Mr. G. T. Porritt showed *Nephopteryx angustella*, bred from larva sent to him from near London ; and the larva of *Notodonta chaonia*, collected by himself at Edlington Wood, near Doncaster, the previous Monday. Mr. C. P. Hobkirk, mosses as follows :—*Gymnostomum commutatum*, found by Dr. Wood in North Wales, and recently detected as such by Mr. John Whitehead. This is the only European locality. Also *Tortula mucronata* in fruit, from Mickleham, in Surrey, sent by Dr. Braithwaite.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting July 28th, the vice-president, Mr. B. Cooke, in the chair. A paper, communicated by Mr. E. Birchall, F.L.S., of Douglas, was read, on "The Diurnal Lepidoptera of the Isle of Man." The usual conversazione terminated the meeting.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—344th meeting, July 29th, Mr. W. B. Turner, F.C.S., in the chair.—Mr. Jas. Abbott exhibited the following slides:—algæ from Bramhope, desmids, *Staurostrum*, *Cosmarium*, *Hyalotheca*, *Zygnema cruciata* (in conjugation) and *Ulothrix mucosa*. Mr. Abbott also reported the names of the organisms present in his Bramhope gathering (see note at p. 24). Mr. Turner exhibited *Scytonema mychrous*, *Oscillatoria nigra*, *Ulva crispa*, *Micrasterias rotata*, *M. denticulata*, *Tetramorus granulatus*, *Protococcus viridis*, *Cladophora crispata*, *Monostroma bullosum*, *Vaucheria Ungerii*, *Batrachospermum moniliforme* (stained), *Draparnaldia plumosa*, and germination of spores of *Cladophora*. Mr. F. Emsley, algæ and desmids from Meanwood (*Tabellaria*, &c.), Vesper Gate, Askham Bog (*Draparnaldia*), Moortown, and Adel (*Meridion circulare*). All the above were shown with the desire of illustrating the pre-determined subject of fresh-water algæ. A manuscript catalogue of the confervoid algæ of the Leeds district, prepared by Mr. Turner, with the assistance of Messrs. Abbott and Emsley, and containing 138 species, was presented to the Society. Among objects of general interest, Mr. Washington Teasdale exhibited Abbé "Diffraction Platte," by Zeiss of Jena; also four interesting slides of *Actinocyclus subtilis*, and *Aulacodiscus Africanus* and *A. Berkeleyi*, mounted by Mr. Nicholson of Fareham, at the great age of 92. Mr. F. Emsley showed a very fine slide of the fish-louse, *Argulus foliaceus*.

346TH MEETING, August 12th, Mr. W. B. Turner, F.C.S., in the chair, showed a section of *Marchantia*, the advanced stage of *Cladophora*, leaves of mosses, also a large book of microscopic drawings. Mr. James Abbott, slides of *Nostoc commune* and of *Collema*. Mr. F. Emsley, *Lyngbya muralis* and eggs of moth.—W. D. R.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Ordinary meeting, July 14th, Mr. John Whitehead, the president, in the chair.—The president exhibited various interesting mosses gathered by himself and a party of friends in Littondale, West Riding of Yorkshire, during Whit-week. Foremost amongst these was *Zygodon Nowellii*—a very rare moss in any state, but particularly so with fruit. Several capsules were found. The moss was first discovered in 1856 by the late John Nowell, and its place in the muscal family was for some years the subject of much controversy. Wilson gave it the name of *Zygodon gracilis*. Schimper, on the other hand, considered it to be a species of *Didymodon*. In 1866 the point was settled by the discovery of fruit by Nowell himself, and Schimper bestowed upon the plant the name of *Z. Nowellii* (in honour of the Lancashire muscologist), which is now generally adopted. The president said

that another rare moss—*Mnium orthorrhynchum*—was found in Littondale, with male flowers only, though Nowell was credited with the discovery of fruiting specimens. *Mnium serratum* was plentiful and in fine condition; also the rare *Seligeria tristicha*, but mostly barren; excellent specimens of *Orthotrichum rivulare*; and a curious variety (*pilifera*) of *Encalypta vulgaris* were the most important things gathered during the excursion. The president further announced the receipt of *Tortula Hibernica* Mitt.—a rare moss, whose only habitat is Cromagloun, near Killarney. *Trichostomum glaucescens*, from Clova; *Mnium stellare* (with male inflorescence) and *Tortula vinealis*, in fruit, from Derbyshire; *Rhynchostegium depressum* (fr.), from near Bolton; and *Hypnum chrysophyllum*, from near Ashton-under-Lyne, were also exhibited by the president. Mr. W. H. Pearson (vice-president), who was unable to be present, forwarded a specimen of drawings of a rare species of hepaticæ collected on the 28th April by himself and Mr. Wild in the pass of Llanberis. The species, Mr. Pearson wrote, had been collected previously in Scotland by Messrs. Black, Croall, Hunt, and Sim. He intimated that it would be given in the second fasciculus of the “*Hepaticæ Britannicæ Exsiccatae*” (along with the variety *laxior*), which is to be issued this month. The other specimens exhibited at the meeting comprised *Bryum Marrattii*, by Mr. Holt (found in considerable abundance this year at Southport); *Leskea subrufa*, from Miller’s Dale, by Mr. Wild; also *Catoscopium nigritum* and *Cynodontium Bruntoni*, by Mr. Cash—the former from Southport and the latter from near Matlock. The *Catoscopium*, with very young setæ, was found on the 14th June growing in moist ground among the sandhills at Birkdale. A single tuft was removed, and the capsules developed beautifully in cultivation.

MEETING, Aug. 11th, the president in the chair.—A number of interesting cryptogamic plants were placed on the table for inspection. Mr. T. Brittain gave an account of *Verrucaria nitida*, a lichen which is found on the bark of trees, especially on that of the ash. Its habits and structure were described, the latter being shown by means of the microscope. The mosses exhibited by the president were *Hedwigia striata*, Wils, from Grasmere, which he, along with Mr. Fergusson, proposed to restore again to the rank of a distinct species; *Scleropodium caespitosum* from Miller’s Dale; and *Rhabdoweissia fugax* and *R. denticulata* from Cader Idris; also *Gymnostomum commutatum*, Mitt., gathered by Dr. Wood on moist rocks at Trefriw, N. Wales, June, 1861. Mr. Holt showed *Amblystegium irriguum* from Mellor, in fruit. A few lichens and mosses from Connemara were shown by Mr. Hyde. Mr. W. H. Pearson exhibited *Cephalozia Schmezeri* from Barton Moss—a new locality for this plant,—and promised to read a paper upon it at the next meeting.

YORKSHIRE NATURALISTS’ UNION.—HEBDEN BRIDGE, July 19th, 1879. *Report of the Geological Section*.—In the absence of Prof. Green, the president of the Section, Dr. W. Alexander, J.P., of Halifax, was elected

chairman. Pieces of limestone containing fossils, obtained during the day, were handed round for the inspection of the members, as were also a large number of slides of the material, full of the beautiful minute fossils which abound therein. These had been mounted for the occasion by the secretary, from material obtained on a former visit. A number of coloured sections of the strata of the district, also prepared by the secretary, were hung on the walls. The chairman stated that he had written and published a paper on the geology of the district 40 years ago, which contained a list of fossils drawn up by the late Mr. Samuel Gibson, of Hebden Bridge. Many of the names were crude and rather fanciful, and the sketch of the strata which he had drawn up was by no means to be compared with the elaborate sections drawn by Mr. Spencer, but still he hoped they would afford some little interest as memorials of Mr. Gibson, and in showing what had been done in former times. Mr. B. Holgate, F.G.S., said that he had been much pleased with his visit, and would have been more so but for the rain. He had formed one of a party of four, including Prof. Green, Mr. Spencer, and Mr. Ashworth, who had gone up the valley to the place where the limestone band cropped out. They had obtained plenty of the material, but the bad weather had prevented them from breaking it up to extract the fossils. The secretary had, however, brought a heavy load, and when he had worked up the material, the list of fossils obtained would be recorded in the minutes of the Section. Mr. Tindall, of Huddersfield, offered a few remarks, after which the secretary gave a sketch of the geology of the district. He said so far as he had been able to make out, the harvest of fossils obtained that day would be a good one, and the list would most undoubtedly have been a very large one had the day been fine. As it was, he had noticed the following species:—*Goniatites Gibsoni* (a most beautiful little fossil very like an ammonite), *G. reticulata*, *G. Loonyi*, *G. striatus*, *G. spirorbis*, *Orthoceras*, *Nautilus*, *Posidonomya*, *Modiolopsis* and *Aviculo-pectens*. Perhaps a few words on the physical geology of the district would not be out of place. We are now in the valley of the Calder, which from Hebden Bridge to Todmorden has been scooped out of the Yoredale strata, as have also the deep valleys of the Hebden and Horsebridge Cloughs. The Kinder grit forms the great escarpments overhanging those valleys. Going from the Kinder towards the moor in any direction, we traverse the extensive series of the third grits. These beds are very fossiliferous. A short distance to the west we come to the apex of the Pennine anticlinal, and the Kinder grit again crops out, facing the west like a great mountain wall, along which the line dividing Lancashire from Yorkshire is carried. The dip slope of the great anticlinal is a gentle one of about one yard in 21 on the Yorkshire side, but on the Lancashire side the rocks dip rapidly, almost standing on their ends for some distance. The consequence of this is, that we meet with the coal strata on the Lancashire side in a short distance from the summit of the ridge; in some places they are said to actually come over the ridge into Yorkshire, but

on the Yorkshire side we have to traverse mile after mile of wild heather-clad moorlands of millstone grit, and only come across coal strata at Halifax—a distance of ten miles from the apex of the ridge.

YORKSHIRE NATURALISTS' UNION.—The fifth meeting for 1879 was held at Doncaster on Bank Holiday, August 4th, and was very largely attended. The district proved extensively rich and full of interest, and the operations of the day yielded good results to all the Sections. The entomologists spent their day in the rich hunting grounds of Edlington Wood and Loversall Quarry, while several of the botanists explored Potteric Carr, Sandal Beat, and the surrounding country. At the general meeting, which was held at the Reindeer Hotel, Doncaster, the chair was occupied by the president, Mr. H. Clifton Sorby, LL.D., F.R.S., &c., of Sheffield. A vote of thanks was passed to the new subscribers, namely, Messrs. Jno. Marshall of Sowerby Bridge, John Potts and John Hawley of Doncaster, and the Rev. H. Thomas of Warmsworth. A similar vote was warmly accorded to the local secretary, Mr. Thomas Birks, jun., of Goole, for very efficient arrangements. The Sectional Reports were then given as follows :—Mr. W. E. Clarke, of Leeds, secretary to the Vertebrate Section, reported : The localities visited by the members of this Section were Sandal Beat, Cantley, Black and Potteric Cars, Conisbro', Edlington Woods, Darfield, Ickleton, Brodsworth, Marthwick, and Melton-on-the-hill. The animals observed were the mole, squirrel, fox, shrew, and common bat. The birds were numerous, 48 species being reported, representing 38 residents and 10 migrants. The principal species in these divisions were among the residents—the sparrow-hawk, kestrel, jay, green woodpecker and young, hawfinch and young, goldfinch, bullfinch, and great bunting ; among the migrants, the whinchat, willow wren, whitethroat and young, spotted flycatcher, yellow wagtail, martin, sand martin, swallow, and swift—the most noteworthy species being the hawfinch and young, and the goldfinch, both observed by Mr. Wm. Talbot during a long walk from Wakefield. The president of the Section (Mr. Thos. Lister) made some remarks on the abundance of certain species of the warblers this season, notably the chiff-chaff.—Mr. Joseph Wilcock, of Wakefield, reported on behalf of the Conchological Section.—Mr. S. D. Bairstow, of Huddersfield, secretary of the Entomological Section, reported as follows :—The Section had had one of its most successful days in connection with the Union. Messrs. W. Prest, G. T. Porritt, and Hinds had come across a colony of the very local *Scoparia basistrigalis*, and had taken it in abundance in an area of perhaps a hundred square yards in Edlington wood. A dozen or more were repeatedly found on the trunk of a single large tree. They had also found fine larvæ of *Notodonta chaonia* crawling up the oaks on the same ground. Other good species, taken either as larvæ or imago by various members of the section, included—*Thecla W-album*, *Ennomos fuscantaria*, *Phorodesma bajularia*, *Timandra*

amataria, *Anticlea rubidata*, *Scotosia vetulata*, *Ebulea crocealis*, *Scoparia crataegalis*, and many others. As showing the extraordinary character of the season, *Abraxas ulmata* was still out commonly in good condition, and *Melanthia albicillata* was by no means over. A good deal of the success of the section was due to the leadership of Mr. John Hawley, of Doncaster, and to whom a unanimous vote of thanks was passed.—Mr. William West, of Bradford, secretary of the Botanical Section, reported that the places botanised over during the day were all in the Don drainage. A larger number of species had been seen than at any previous ramble of the Union, and this was accounted for by the fine weather and the various strata botanised over, for Doncaster is built on the Bunter sandstone, which is overlaid in many places by alluvial deposits, while the productive Permian limestone lies close to the town on the west. But the richest ground of all was the peaty tract to the south, where there was a perfect feast of Hygrophyllous plants, and where the Bunter pebble beds about Cantley are covered only by gravel, several of the rarest plants of the day were found. One party worked from Conisborough to Doncaster, another to the south of Doncaster, while a third took the direction of Seat, Sandal Wood, and through Cantley, returning by way of Potteric Carr. The total number of vascular plants observed was 452, and cryptogamic plants were certainly not very conspicuous, though a few were observed, and many more would undoubtedly have been noticed but the Carrs had to be rapidly gone through by some of the investigators in order to reach Doncaster *too late* for tea. Among the rarer plants observed were—*Thalictrum majus*, *Ranunculus circinatus*, *R. Lingua*, *R. arvensis*, *Helleborus viridis* (Conisborough), *Nuphar lutea*, *Corydalis claviculata*, *Barbarea stricta*, *Cerastium arvense*, *Stellaria glauca*, *Hypericum montanum* (Conisborough), *Ulex nanus* (Racecourse), *Trifolium striatum*, *Vicia Bobartii*, *Potentilla argentea*, *Rubus suberectus*, *R. Sprengelii*, *R. corylifolius*, *Myriophyllum alterniflorum*, *Callitriche stagnalis*, *Eranthe fistulosa* (near Conisborough), *Carduus pratensis*, *Anthemis arvensis*, *Filago apiculata*, *Pyrola minor*, *Chlora perfoliata* (Conisborough), *Hottonia palustris*, *Daphne Laureola* (Edlington Wood), *Typha angustifolia*, *Lemna trisulca*, *L. gibba*. *L. polyrhiza*, *Hydrocharis Morsus-ranæ*, *Stratiotes aloides*, *Orchis pyramidalis* (S. of town), *Cladium Mariscus* (Askern) *Scirpus fluitans*, *Carex muricata*, *C. Pseudo-cyperus*, *C. vesicaria*, *Agrostis Spica-venti*, and *Aspidium spinulosum*. All the above plants, except where the localities are specified, were got on the route embracing Cantley and the Carrs. Twenty species of mosses were observed, including *Brachythecium glareosum*, *Barbula Hornschuchiana*, and *Pogonatum nanum*. Six common species of Hepaticæ were noticed. Six lichens were observed, including *Peltigera polydactyla*, and also twelve species of fungi, including *Melampsora populina*, *Tilletia caries*, *Æcidium tussilaginis*, *Uredo Circeæ*, *Trichobasis suaveolens*, *Phallus impudicus*, and *Polyporus squamosus*.—The Geological Section was entirely unrepresented.—W. D. R.

Diary.—Meetings of Societies.

- Sept. 2. Leeds Naturalists', &c., Entomological Section. Liversedge
Naturalists'. Bishop Auckland Naturalists'.
,, 3. Wakefield Naturalists'.
,, 4. Yorkshire Naturalists' Union—Excursion to Selby for Riccall
Common.—Local Secretary, Mr. W. N. Cheesman, The
Crescent, Selby.
,, 9. Leeds Naturalists', Microscopical Section.
,, 10. York and District Field Naturalists'.
,, 12. Huddersfield Scientific Club.
,, 16. Leeds Naturalists', Vertebrate Section.
,, 18. Dewsbury Naturalists'.
,, 19 and 20. North Staffordshire Naturalists' Field Club—Excursion to
Breidden Hills, Welshpool, &c.—Leader, Mr. W. P. Baildon.
,, 23. Leeds Naturalists'—General Meeting.
,, 29. Lancashire and Cheshire Entomological.

CATALOGUE OF YORKSHIRE BIRDS.

The compiler tenders his thanks to those who have responded to his request for information as to the *Accipitres*, and would now be glad to receive similar lists with remarks as to the distribution, abundance, breeding and rare occurrences of the first portion of the *Insessores*, comprising the families *Laniidae*, *Muscicapidae*, *Cinclidae*, *Turdidae*, *Sylviidae*, *Troglodytidae*, *Paridae*, and *Ampelidae*, (Shrikes, Flycatchers, Dipper, Thrushes, Orioles, Accentors, Robins, Redstarts, Chats, Warblers, Wrens, Tits, and Waxwing). All assistance will be duly acknowledged by W. W. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

EXCHANGE.

Sparrow-hawk, Green Woodpecker, Red Grouse, Waterhens, &c., in separate cases, for which I should be glad to receive yearly volumes of "Science Gossip," bound or unbound (except 1877 and 1878—or offers.—J. R. MURDOCK, 40, Leighton Lane, Leeds.

Mr. J. R. MURDOCK having undertaken to arrange a collection of Yorkshire Mosses for the Leeds Naturalists' Herbarium, would be glad of the assistance of any bryologists who may feel disposed to contribute good specimens of mosses gathered in Yorkshire.—Address 40, Leighton Lane, Leeds.

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No. LI.

OCTOBER, 1879.

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Original Articles.

A NEW *BRYUM* (*B. ORIGANUM*).

BY H. BOSWELL.

AMONGST a few critical mosses gathered by Mr. Wesley in Teesdale last June, and sent me for examination, is one which has proved very interesting and difficult to determine. At first sight the reddish tint of the upper leaves suggested *B. pallens* or *turbatum*, but the habit and foliage were very unlike those mosses, and resembled *B. barbatum*, Wils., under which name I was disposed after some further inspection to let it remain, but there are certain points of difference which it seems impossible to ignore, and as at the same time the present plant seems to disagree with all previously known species, there seems to remain no other course but to give it a new name, however undesirable it may be to increase our list with another imperfect species, for it was unfortunately gathered in small quantity only, and is without flowers or fruit; but the form and texture of the leaves appear distinct and sufficient to render it well marked. The name proposed was suggested by the peculiar colours, and it may be thus described:—

“*BRYUM ORIGANUM*, nov. sp.

“Stems elongated about an inch or more, copiously radiculose and forming dense soft tufts. Leaves ovate and ovate-lanceolate shortly pointed, scarcely acuminate, concave, nerved almost to the apex, cells leptodermous oblong and nearly rectangular, margins plane, slightly recurved when dry, formed of a single row of narrower cells.”—Shady Old Wall, Teesdale, June 1879, J. S. Wesley.

In soft dense tufts, foliage full green, the young leaves at the summit rosy-pink, the old foliage of former years and lower part deep brown, stems and leaves matted with numerous radicles. Habit and general aspect much as in *B. barbatum*, Wils., or some forms of *B. ceneum* from Norway; from the former it differs in the form of the leaves which are not piliferous-acuminate, in the nerve ceasing below the apex, in the form of the cells and their very thin walls. The name of *B. barbatum* has been changed in the second and recent edition of Schimper's excellent Synopsis, but for what reason does not appear, any more than in the analogous case of *Zygodon gracilis*.

Oxford, August, 1879.

N. S., VOL. V., OCT., 1879.

A LIST OF BIRDS IN THE TOWNSHIP OF SCARCROFT.

BY W. H. HAY.

SCARCROFT is a village about six and three-quarter miles north of Leeds ; it is a well wooded district, intersected by numerous streams, and contains several large ponds and mill-dams—making the district one of great interest to the ornithologist.

Kestrel (*Falco tinnunculus*).—I have only seen a few pairs of this hawk during all the years I have worked the district.

Sparrow Hawk (*Accipiter Nisus*).—Equally scarce as the kestrel. A pair occasionally breeds in the woods, but are generally shot by the keepers before the young can fly.

Barn Owl (*Strix flammea*) and Tawny Owl (*Syrnium aluco*).—These birds are now almost extinct in the Scarcroft district, owing to the enmity of keepers and farmers.

Spotted Flycatcher (*Muscicapa grisola*).—I am happy to say that of late years this bird has become more frequent.

Missel Thrush (*Turdus viscivorus*), Storm Cock.—Common in all parts of the township.

Song Thrush (*Turdus musicus*), Throstle.—Equally common with the last named.

Fieldfare (*Turdus pilaris*), Felfer.—A winter visitant arriving in the district about the middle of October, departing end of March or beginning of April. Numerous.

Red-wing (*Turdus iliacus*).—This bird is often confounded by the country lads with the missel thrush. I have been told time after time that the Redwing was building in such a place, but I need scarcely add that the news was false. Plentiful.

Blackbird (*Turdus merula*).—A common bird in the township. During the past severe winter of 1878-9 I noticed that the blackbird stood the cold and was in better condition at Christmas than either the fieldfare or redwing.

Hedge Sparrow (*Accentor modularis*).—A very common bird in this district, one of our earliest breeders.

Robin (*Eyrthaca rubecola*), Robin Redbreast.—This bold little favourite is moderately abundant ; it is also an early breeder.

Redstart (*Phoenicurus rubicilla*) Red-tail.—One of our summer migrants. An irregular visitor in this township ; in 1875 it was common, whereas in the following year it was scarce.

Grasshopper Warbler (*Salicaria locustella*).—A summer visitor, breeding in the township. I am inclined to think that it is more common than is thought.

Stonechat (*Saxicola rubicola*).—A few pairs make their appearance during the spring, but I do not think they breed in the township.

Whinchat (*Saxicola rubetra*).—Not common ; breeds here.

Sedge Warbler (*Salicaria phragmites*).—This migrant is common at Scarcroft, and is often mistaken for the nightingale.

Black-cap (*Curruca atricapilla*).—A very shy bird, common in this district : one of our sweetest songsters.

Whitethroat (*Curruca cinerea*), Nettle-creeper, &c.—Common at Scarcroft. Its nest may be found in any of the lanes.

Lesser Whitethroat (*Curruca sylvicola*).—Not so plentiful as the last-named.

Willow Wren (*Sylvia trochilus*) Yellow Wren.—A lively little bird, common in the township.

Chiff-chaff (*Sylvia hippolais*).—Not very common at Scarcroft.

Golden-crested Wren (*Regulus cristatus*).—About the smallest of our native birds. Scarce in the township ; breeds here ; resident.

Great Tit (*Parus major*), Black-cap, Ox-eye.—A common bird, that may be seen in gardens and fields at any time of the year.

Blue Tit (*Parus cæruleus*), Bluecap.—Equally numerous with the last.

Cole Tit (*Parus ater*).—Not scarce in the township, but not so common as the last two.

Pied Wagtail (*Motacilla Yarellii*), Water Wagtail.—Common in the township.

Grey Wagtail (*Motacilla boarula*), Yellow Wagtail.—May be often seen during winter following the plough.

Tree Pipit (*Anthus arboreus*), Tree-lark.—Not so plentiful as the tit-lark, for which it is often mistaken.

Meadow Pipit (*Anthus pratensis*), Titlark.—This bird may be distinguished from the tree pipit by its mode of singing. The meadow pipit sings in both its upward and downward flight ; *A. arboreus* only during its descent.

Skylark (*Alauda arvensis*).—Common in the township.

Yellow Bunting (*Emberiza citrinella*), Yold ring, Yellowhammer.—
Resident: very common in the township.

Reed Bunting (*Emberiza schæniclus*), Reed Sparrow, Black-headed Bunting.—May be seen on any stream side.

Chaffinch (*Fringilla cœlebs*), Bull-spink.—This beautiful bird is very abundant all over the township.

Mountain Finch (*Fringilla montifringilla*), Brambling. Plentiful during winter, when it consorts with the chaffinch.

House Sparrow (*Passer domesticus*).—During a visit to New York in 1874, I was struck by the rapid increase of this species, which was introduced into that State some short time since. It takes possession of the breeding boxes which are placed against trees and houses for the convenience of the purple martin, and holds them after desperate fighting with the rightful owners.

Greenfinch (*Coccothraustes chloris*), Green Linnet.—Another equally common resident. Breeds freely all over the township.

Linnet (*Linota cannabina*), Grey Linnet, Red Linnet.—Common.

Lesser Redpoll (*Linota linaria*), Chivey Linnet.—Not so plentiful as the last, but well distributed.

Bullfinch (*Pyrrhula vulgaris*).—Rather scarce, owing to the persecution of bird-catchers.

Starling (*Sturnus vulgaris*).—This brilliant-plumaged bird is common all over the township.

Rook (*Corvus frugilegus*) —This well-known bird is very common, although it does not breed within three miles.

Jackdaw (*Corvus monedula*).—A common bird, consorting with the rooks.

Magpie (*Pica caudata*).—A few pairs breed here every season. Are much persecuted by gamekeepers.

Jay (*Garrulus glandarius*), Blue Jay.—A rare bird in the township. I have only seen four or five since 1868.

Wren (*Troglodytes vulgaris*).—During the breeding season of 1876 a pair of these birds built a nest, and reared a brood of young, in the doorway of a summer-house in Mr. Mann's garden at Scarcroft. Not a day passed without someone entering the place, yet the birds showed no signs of fear. The same place

was chosen the following year. Unfortunately the eggs were destroyed, and the birds forsook the place, only to breed in a rustic flower stand on the lawn.

Cuckoo (*Cuculus canorus*).—A common bird all over the township. Hearing the first cuckoo and seeing the first swallow are always great events to lovers of country sights and sounds.

Kingfisher (*Alcedo ispida*).—This is the most beautiful of our native birds; it is not common in the township, but is well distributed.

Swallow (*Hirundo rustica*), House Swallow, Barn Swallow.—The most welcome of our spring migrants: common.

Martin (*Hirundo urbica*), House Martin.—Another favourite bird, not quite so numerous as *H. rustica*.

Sand Martin (*Hirundo riparia*), Bank Swallow.—Not numerous. I only know of one breeding-place in the township, and that is in a sandstone quarry close to the high road.

Swift (*Cypselus apus*), Screech Martin, Long-winged Swallow.—Not common.

Night Jar (*Caprimulgus europæus*), Goat-sucker.—Owing to its nocturnal habits, this bird is seldom seen by casual observers. Far from numerous.

Ringdove (*Columba palumbus*), Wood Pigeon, Stockdove. Common all over the township.

Pheasant (*Phasianus colchicus*).—Not numerous.

Common Partridge (*Perdix cinerea*).—Not common in this district, but more numerous than the pheasant.

Lapwing (*Vanellus cristatus*), Pewit, Tewit.—Common in the township.

Common Heron (*Ardea cinerea*). Only an occasional visitor from Bramham and Harewood Parks.

Woodcock (*Scolopax rusticola*).—One seen here by Mr. Mann, the first week in January of this year (1879).

Land Rail (*Crex pratensis*), Daker Hen.—Common in the district.

Moor Hen (*Gallinula chloropus*), Water Hen.—Plentiful in most of the ponds and streams.

Wild Duck (*Anas Boschas*).—A few of these birds frequent the township every winter.

1, Elmwood Place, Leeds.

THE FRESH-WATER ALGÆ OF THE LEEDS DISTRICT.

By W. BARWELL TURNER,

PRES. MICRO. SECTION, LEEDS NATURALISTS' CLUB.

ABBREVIATED LOCALITIES.

A. B.	Adel Bog.	Mn.	Moortown.
R.	Roundhay.	Be.	Bramhope.
Md.	Meanwood.	K.	Kirkstall.
F.	Farnley.	H.	Headingley.
C.	Chapel Allerton.	Ht.	Hunslet.
P.	Potternewton.	S. M.	South Milford.
L.	In Leeds Town.	Common species are so indicated.	

a. LEMNIEÆ.

Lemania fluviatilis, near Harrogate and Shipley Glen.

β. BATRACHOSPERMEÆ.

Batrachospermum moniliforme, M.
B. vagum, K.

γ. CHÆTOPHORACEÆ.

Choetophora elegans, R., A.
Draparnaldia plumosa, A. B.
D. glomerata, R.
Coleochaete scutata, A. B.

δ. CONFERVACEÆ.

Conferva floccosa, C.
Ulothrix mucosa, Be, R., A.B.
Cladophora glomerata, Mn.
C. crispata, common
Stigeoclonium protensum, F.

ε. ZYGNEMACEÆ.

Zygnema cruciata, Br.
Z. Ralfsii, Br., A.B.
Spirogyra communis, A.B.
S. quinina, R.
S. nitida, A.B., Be.
S. pellucida, Ht.
Zygogonium ericetorum, Be.
Mesocarpus scalaris, R.
Staurocarpus gracilis, Horsforth
Rhynchonema (?) R.

ζ. CÆDOGONIACEÆ.

Cædogonium vesicatum, Be.
Æ. Braunii, A.B.

Cædogonium ciliatum, Be.

Æ. tumidulum, Be, A.

Bulbochoete setigera, A.B.

η. SIPHONACEÆ.

Vaucheria sessilis, A.B.
V. geminata, H.
V. racemosa, Md.

θ. OSCILLATORIACEÆ.

Oscillatoria tenuis, P.
O. autumnalis, H., Be, C.
O. nigra, P.
Scytonema mychrous, Ingleton
Spirulina oscillarioides, Br.
Lyngbya concinnata, P.
L. muralis, R.
Rivularia atra, R.
Leptothrix ochracea, Ht.

<i>Bacterium</i>	} Usually classed with this order, but the genera and their position are in dispute
<i>Bacillus</i>	
<i>Vibrio</i>	
<i>Spirillum</i>	
<i>Spirochoete</i>	

ι. NOSTOCHACEÆ.

Nostoc commune, Knaresborough
N. sphæricum, Ingleton

κ. ULVACEÆ.

Ulva crispa, L.
Monostroma bullosum, R.
Schizogonium murale, R.
Enteromorpha intestinalis, Garforth

λ. PALMELLACEÆ.

- Palmella cruenta*, common
Botrydina vulgaris, H.
Coccochloris protuberans, A.B.
Tetraspora gelatinosa, A.B.
Apiocystis Brauniana, A.B.
Glæocapsa polydermatica
G. ampla, Be.
Ophiocytium majus, Be.
Sciadium arbuscula, Harrogate
Hydrocytium ? sp. Be.
Chlorosphæra ? sp. Be.

μ. DESMIDIACEÆ.

- Desmidium Swartzii*, Be.
Hyalotheca dissiliens, Be.
Micrasterias rotata, Adel
Euastrum oblongum, Be.
Cosmarium margaritiferum, Be.
C. tetrophthalmum "
C. pyramidatum "
Arthrodesmus convergens "
Staurostrum furcigerum "
S. gracile "
S. dejectum "
Tetmemorus granulatus, R., A.B.
Docidium baculum, A.B.
Closterium lunula, Md., A.B.
C. Ebrebergii, Cookridge, A.B.
C. " var. *β*, A.B.
C. moniliferum, A.B.
C. lanceolatum, R., A.B.
C. cornu "
C. setaceum, Md., R., A.B.
C. acutum "
Sphærozosma vertebratum, Raw-
 cliffe Common
Pediastrum granulatum, A.
Ankistrodesmus falcatus, C., A.B.
Scenedesmus quadricauda, Be.
S. obtusus "
S. obliquus "

ν. DIATOMACEÆ.

- Epithemia turgida*, Be.
Eunotia triodoa, R.
Meridion circulare, Horsforth, A.

- Diatoma vulgare*, R., A., H.
D. elongatum, R.
Fragillaria capucina, C., R.
Odontidium turgidulum, R.
Cyclotella ? sp. "
Melosira variæus, A.B., R.
Nitzschia sigmoidea, S. Milford, A.
N. lanceolata, R., South Milford,
 Killingbeck
N. tœnia, R.
N. minutissima, R.
Cymatopleura elliptica, S. Milford,
 Roundhay
C. solea, S. Milford, Roundhay
Surirella bifrons, R., S.M.
S. ovata "
Squedra splendens, S.M., R.
S. lanceolata, R.
S. capitata, S.M.
Amphipleura pellucida, R.
Cocconeis pediculus, R.
C. scutellum, S.M.
Achnanthidium microcephalum, C.
A. flexellum, Adel
Cymbella, ? sp. R.
Cocconema lanceolatum, R.
C. cymbiforme, "
Gomphonema geminatum "
G. acuminatum "
G. olivaceum "
Sphenosira catena, "
Navicula cuspidata, S.M., R.
N. amphirhynchus, R.
N. rhomboides, S.M.
Gyrosigma attenuatum, S.M.
G. acuminatum, R.
G. lacustre "
G. tenuissimum, S.M.
G. Spencerii, "
G. angulatum, "
G. " var. *β*, S.M.
Pinnularia viridis "
P. radiosa "
P. minor, R.
Stauroneis phœniceuteron, S.M.
Amphora ovalis "

Tetracyclus lacustris, R.
Tabellaria flocculosa, Horsforth

ξ. VOLVOCINEÆ.

Protococcus viridis, common

P. pluvialis, L.
Pandorina morum, Be, York.
Gonium pectorale, Wortley
Volvox globator, Be, Ht.

Gatherings and determinations made by J. Abbott, W. B. Turner, F.C.S., &c., and F. Emsley, August 1878, to August 1879.

Leeds Naturalists' Club,
29th Aug., 1879.

Rainfall for August.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4·18	21	21·68	* 20·07	16	0·58
LEEDS ... (H. Crowther) ...	183	4·10	18	...	...	16	0·68
HALIFAX... (F. G. S. Rawson)	360	5·60	21	30·99	28·58	..	...
BARNSELY ... (T. Lister) ...	350	4·54	19	22·99	18·07	17	2·02
INGBIRCHWORTH (do.)	853	5·39	16	28·07	27·44	17	0·73
WENTWORTH CASTLE (do.)...	520	5·02	15	24·86	19·07	17	1·61
GOOLE ...	25	3·30	17	18·69	14·96	2	0·70

* This is the average to date for 13 years, 1866-78.

Short Notes and Queries.

THE HAWFINCH AT HUDDERSFIELD.—On the 2nd inst., I had the pleasure, for almost an hour, of watching a beautiful hawfinch in my garden. I was under the impression this bird was usually considered a very shy one, but this was as fearless as a robin. When first seen, it was feeding on the seeds of the grass growing at the edge, and on the gravel drive, twelve or fifteen yards from the front door of the house, but it gradually worked its way up to beneath the window, and was for a quarter of an hour or so only from about two to three yards from where I and Mrs. Porritt stood at the window watching it. Although it must have seen us, it did not seem at all alarmed so long as we remained perfectly still; but a slight noise evidently disturbed it once, when it flew over into the adjoining shrubbery, but was back again on the gravel path in a few minutes. We of course saw every movement, and even every grass seed as the bird pecked them off. The hawfinch has nested

here several times. I remember seeing a nest and eggs taken outside the town, some years ago, and have heard of one or two other instances since.—GEO. T. PORRITT, Highroyd House, Huddersfield, Sept. 5th.

NESTING OF MONTAGU'S HARRIER NEAR YORK.—It is not without pleasure that I am able to record the nesting of Montagu's harrier (*Falco Montagui*), near York, and as this bird is very rarely met with in any part of Britain, perhaps a few notes concerning it will be interesting to the readers of the *Naturalist*. In the spring of 1875, Mr. Widdas (a well-known naturalist both in Leeds and York) and two of his ornithological friends were rambling through the woods, in the neighbourhood of Sutton-on-Forest. They had been searching about for some time, when, approaching some whin bushes, out flew a harrier, which from its small size and general appearance they unmistakeably came to the conclusion was none other than *Falco Montagui*. Luckily for the bird, Mr. Widdas' gun was unloaded at the time, so they contented themselves with gazing at the bird until it disappeared from view; then advancing towards the spot where they first saw it arise, they were surprised to find a nest, containing one egg, placed on the top of some brambles. As it was the first Montagu's harrier's nest they had seen *in situ*, no little time was spent in examining its structure. The nest, which was built about 8ft. above the ground, was chiefly composed of rushes and other aquatic plants. It measured about 1½ft. in diameter. In the centre was a hollow about the size of a boy's cap. Other materials used were cow's hair, moss, grass, &c. The egg is now in my possession, and differs very slightly from other eggs of the Montagu's harrier in my collection.—WALTER RAINE, Leeds, Sept. 18th.

KITE v. BUZZARD.—In the *Naturalist* for August (vol. v., p. 10) Mr. Clarke expresses his opinion—or, as this term to a certain extent presupposes ignorance, it would perhaps be more correct to say judgment—that I was probably wrong in my identification of the bird I saw in the neighbourhood on the 7th Sept., 1877. Mr. Clarke inclines to the belief that I mistook the bird for a buzzard. This verdict he bases on two grounds: first, that he has himself observed the buzzard fly in exactly the same manner as my description of the flight of the above-mentioned bird; second, that the buzzard is subject to great variety, light-coloured, even white, heads being by no means uncommon. I quite agree with Mr. Clarke, notwithstanding all that has been written to the contrary, that the buzzard does frequently fly at a somewhat great elevation and in sweeping circles, but this habit is not often indulged in when in quest of food. The bird which I saw on the above date, and which I took to be a kite, was flying at an elevation of not less than 300 feet, and was evidently searching for food. It wheeled around and around with motionless wings, over a field at the northern extremity of this village, with such ease, buoyancy, and elegance, and capable of being to all appearance prolonged to almost any length of time without apparent

exertion, that precludes me from entertaining the idea that it was a buzzard. I find, on referring to the *Zoologist* for 1877, that no less than three kites were seen in the county of Norfolk. One observed by Mr. Gurney, jun., on May 2nd, had a light-coloured head. The sky was very clear at the time, and he saw its head distinctly. Another is recorded by Mr. Stevenson as having been killed about the third week in January. Taking into consideration the facts that with advancing age the head becomes lighter-coloured, in one sex at least, and the above specimen mentioned by Mr. Gurney, the occurrence of the kite in this part with a light-coloured head is not an extremely improbable contingency. I may add, in conclusion, that I was not favourably situated for observing its tail, even had it struck me at the moment, as I was on the brow of the hill overlooking the beautiful Goit Stock valley, with an extensive tract of moorland in the background. If I had seen the bird from beneath, I could not have failed to notice the formation of its tail, which is its most distinctive feature.—E. BUTTERFIELD.

WHITBY CONCHOLOGICAL ADDENDA.—Seeing that so much care is being taken to compile a list of the molluscan fauna of Whitby and neighbourhood, perhaps it would be as well to send from time to time such additions as one comes across whilst there, in the hope of attracting other malacologists who reside nearer than ourselves to the work. Common things which one scarcely ever puts into a list, such as *Helix aspersa*, *Arion ater*, *Limax agrestis*, &c., are here, as elsewhere, a nuisance; nor is a yellow variety of the black slug *A. ater* uncommon just outside the town. To the slugs we might add *Limax maximus*, which occurs very abundantly in Bagdale, in company with *L. flavus*, which has been already recorded. Near to Saltwick we took, whilst examining in a pond some fresh-water algæ, (*Cladophora*) *Pisidium amnicum* and *P. pusillum*. At a short distance from this pond we came across *Limnæa peregra*, var. *decollata*, in a horse-trough. Remarks respecting captures, in whatever order, being always more useful than bare lists, we append a little observation made on this variety. The trough is a small one, little used, and doing duty for two fields. From a rill in one of these comes the supply of water, which fills the trough up to a certain height, where it is checked by an exit pipe. The collected water is exceedingly clear, not a particle of mud visible, and but little sediment at the bottom—due, without doubt, to the filtration which the water has undergone while passing along the sandy bottom of the water-course. It is evident that under such conditions little lime is present, and yet in this narrow area are hundreds of decollated *peregra*, living and multiplying. If lime be very scarce or absent, abnormal shells must be produced, and this is practically the case, for thin, small truncated shells only obtain. It has been put forth more than once that snails decollate their own shells. This may be true of terrestrial ones, but, from observations made upon some *L. stagnalis* which I have now in an aquarium, existing under circumstances somewhat analagous to the case under

citation, the cause of the erosion of shells is not hidden, for even when well supplied with algæ, the animals take a delight seemingly in eating the shells of their associates, until in some cases the habitation is eaten through, and the animal dies. Given, then, two aquaria—one artificially, and the other naturally supplied with water, in each case a certain form of shell being produced—might we not then surely say that decollation, especially in fresh-water molluscs, is due to the action of snails other than the occupants of the decollated shells, when its cause has been traced in the artificial, and no other cause can be assigned in the natural aquarium? Can we hope that we have given the deathblow to the long-drawn idea that water molluscs cut off the apex of their own shells so that they may be lighter in travelling? In all my decollated *peregra* other points of erosion are palpable, plainly pointing to a natural cause for the production of the variety *decollata* amongst our fresh-water molluscs.—In the Esk at Cruckley Gill we found *Unio Margaritifer*, and rarely the var. *sinuata*; in the woods there, *Helix fusca*. Amongst marine findings we have nothing to add beyond var. *Electissima* of *Trochus cinerarius*, Whitby, and *Chiton marginatus*, Robin Hood's Bay.—HENRY CROWTHER, The Museum, Leeds, Sept. 17th, 1879.

Acronycta alni NEAR WAKEFIELD.—Whilst beating for larvæ in Haw Park, a boy (J. H. Hunt) whom I had to assist me, beat a half-grown *alni* larva out of an oak bush. It is still alive, and now prefers sallow to oak for its food.—C. W. RICHARDSON, St. John's Grove, Wakefield, Sept. 17th.

Acronycta alni AT YORK.—On Tuesday last I was at Sandburn with my friend Mr. R. Hind and his son Austen, when the latter found a very fine full-grown larva of *A. alni*.—W. PREST, Sept. 17th.

ENTOMOLOGICAL CAPTURES AT SKEGNESS.—At Skegness, on Saturday last, *V. Cardui* was in great abundance; I and Mr. W. Talbot took six very good specimens each, and saw a great many more. *Plusia gamma* literally swarmed, and proved a great nuisance. The larvæ of *B. rubi* and *E. Jacobæ* were to be seen everywhere on the sandhills and in all stages of growth from half-an-inch long.—C. W. RICHARDSON, Sept. 17th.

ENTOMOLOGICAL CAPTURES NEAR DONCASTER.—At Edlington Wood, on Sept. 1st, with my friend Mr. C. W. Simmons, I found *Scoparia basistri-galis* still out, but much worn; and *Thecla W-album*. We had also the pleasure of taking a fine series of *Hyponomeuta plumbella*. When I reached York I saw that Mr. Hind, who was with us at the August excursion, had also bred *H. plumbella* from larvæ then taken off spindle. I also took in the wood fine specimens of *Ennomos angularia* and *Tinea semifulvella*.—W. PREST, 13, Holgate-road, York.

CORRECTION.—In the "List of Mosses occurring near Wetherby," in the September number of the *Naturalist*, *Ulota intermedia*, Schpr., is an error; how it got inserted I know not. I find also *Barbula Hornschuchiana* and *revoluta* in plenty on limestone walls.—J. S. WESLEY.

Reports of Societies.

BARNSELEY NATURALISTS' SOCIETY.—Meeting Sept. 16th.—The botanical section gave in its report of flowers noted, since last meeting, within five miles radius of Barnsley, and those from a distance. The most rare for this part were *Echium vulgare*, *Carduus palustris* and *Linaria minor*—all from the vale of Dearne. The entomological section reported the insects taken, not many being different from former seasons. In the ornithological department, the resumption of song by the robin, willow warbler, wood warbler, and yellow-hammer, was noted. The swift was observed on the second week of this month. Night-flying birds noted August 12th, supposed to be stints and other waders disturbed by the guns on the moors, still fly over the town. Gulls frequently observed flying overhead. Blackbirds, thrushes, and larks yet scarce, and rarely heard to sing; on the other hand lesser redpoles, meadow pipits, starlings, and titmice are seen about the houses near the town.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting August 19th, the president in the chair.—Mr. Benney read a paper entitled “A Thunderstorm.” Entomological specimens were exhibited by Messrs. Firth, Hodgson, Terry, Butterfield, and Carter, including *M. rubiginata*, *L. olivata*, and *N. mundana*, from Shipley Glen; and *S. basistrigalis*, from Edlington Wood. Messrs. E. P. P. and J. A. Butterfield sent *A. scutulata*, *E. minutata*, and *E. castigata*, from Bingley,—new to the district record list. Mr. Hodgson exhibited *A. herbida*, from Hawksworth, also new to the district record list. Messrs. West and Soppitt described the condition of the Botanic Garden in Lister Park, and enumerated a good list of plants which have recently been added. Mr. Andrews exhibited *Plantago maritima*, *Glaux maritima*, and *Honkeneya peploides*, from Morecambe.

MEETING, Sept. 2nd, Mr. Illingworth in the chair.—Mr. Firth gave Part II. of his paper on the “Birds of the Bradford District.” Altogether he has enumerated 131 species, including the golden oriole, stonechat, grasshopper warbler, goldcrest, golden plover, heron, curlew, &c. Local insects were exhibited by Messrs. Firth, Hodgson, Crawshaw, Andrews, Starling, Illingworth, Hebblethwaite, and Cooper. They included *A. scutulata*, *N. baja*, *E. mensuraria*, *A. aprilina*, and a large number of commoner species. Messrs. West, Soppitt, and Saville exhibited the following plants:—*Campanula glomerata*, *Parnassia palustris*, *Senecio ærucifolius*, *Vaccinium oxycoccos*, *Asplenium viride*, *Polypodium calcareum*, &c.—J. W. CARTER, Hon. Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting September 12th, Mr. S. L. Mosley, V.P., in the chair.—Mr. John Conacher showed a very remarkable sport of *Plantago major*,—it was a very large specimen, and had all the florets stalked instead of sessile. He had gathered it at Preshome, in the north of Scotland. Mr. C. P. Hobkirk, *Bryum organum*, found by Dr. J. S. Wesley on a turf-covered wall by a farmhouse at Lowton, in Upper Teesdale, last June [vide ante page 33]; also *Hylocomium splendens*, in a semifossilized state, sent by Prof. Bayley Balfour from a recently-explored “Crannoge” at Lochlee, near Kilmarnock, where it had been

found along with other vegetable remains and works of man, amongst which were necklets made of twisted stems of *Polytrichum commune*; this was probably the first time a moss had been found in such a condition. The chairman, cocoons of various silk-producing bombyces, including *Attacus cynthia*, *A. mylitta*, *A. yama-mai*, *Actias selene*, *Tilia polyphemus*, *Saturnia pyri*, and *S. cecropia*. Mr. G. T. Porritt showed *Eupithecia innotata*—a species erased from the British list some years ago, but of which he had taken two specimens at Skegness, on the Lincolnshire coast, last July. With the imago he exhibited a figure of the larva, drawn by Mr. William Buckler, of Emsworth, from a continental specimen. The larva feeds on *Artemisia campestris* and probably other species of *Artemisia*. Also specimens of another *Eupithecia*, supposed to be a new species, which had been bred from larvæ found on *Scabious* on the coast at Lynmouth. Also *Phibalapteryx lapidata*, taken by Richard Weaver twenty years ago; and *Pterophorus baliodactylus*, *P. tephrodactylus*, and *P. galactodactylus*, all from Bristol. Part V. of Mosley's "Illustrations of Varieties of British Lepidoptera," containing chiefly the genus *Argynnis*, was laid on the table.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—349th meeting, Sept. 2nd, Mr. Thomas Hick, B.A., B.Sc., in the chair. — Mr. Geo. F. Chantrell, ex-president of the Liverpool Microscopical Society, exhibited a very extensive and interesting series of original drawings and a few slides illustrative of the borderland between animal and vegetable life, and delivered an address upon them. Mr. W. Denison Roebuck exhibited *Cynips gemmæ*, L. (*C. fecundatrix*, Hartig.), *Nematus virescens*, Hartig., and *Pecilosoma longicorne*, Thoms., all collected by Mr. S. D. Bairstow near Huddersfield, and new to the county list of hymenoptera. He also showed *Toxotus meridianus*, from Loversall Quarry, near Doncaster, and *Smerinthus ocellatus*, from Burnt Bridge, near Pannal. Mr. Charles Smethurst exhibited *Liparis salicis*, *Bradyepetes amataria*, *Selenia illunaria*, and *Arbraxas grossulariata*, from Barlby, near Doncaster; and *Thecla W-album*, from Loversall Quarry. On behalf of Mr. A. Clapham, of Scarborough, was shown a MS. table showing all the occurrences of *Vanessa Antiopa* in Britain in 1872, to the number of 176 specimens. A letter from Mr. James Carter, of Masham, was read, in which he noted that *Vanessa cardui* was remarkably abundant in that locality this year, almost as plentiful as *V. urticae*; also that *Apatura Iris* had been taken at Rickling, near Stanstead, Essex, August 11th.—W. D. R.

351ST MEETING, Sept. 16th, Mr. J. R. Murdoch mentioned that Dr. Wesley had presented to the Club herbarium a large number of mosses, collected about Wetherby, excellently preserved, and including *Eurynchium Swartzii*, *Camptothecium nitens*, *Brachythecium plumosum*, *Hypnum fluitans*, *H. cordifolium*, *H. stellatum*, *H. loreum*, *H. splendens*, *Mnium serratum*, &c., mostly in fruit. Mr. John Darley brought a living scorpion, which had been taken in logwood, in a Leeds timber-yard. A specimen of *Zootoca vivipara*, common lizard, from Riccall Common, was

shown. Mr. Walter Raine showed eggs of Montagu's harrier, taken at Sutton-on-the-Forest, near York ; of turtle-doves from Acomb ; of merlin from Darlington ; and three beautiful varieties of the thick-knee plover from Norfolk.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, Mr. John Whitehead, president, in the chair.—The secretary (Mr. Rogers) read a letter from Mr. Boswell, of Oxford, enclosing specimens of several rare mosses. The president laid before the meeting a moss of the genus *Philonotis*, gathered upon Ben Muich-Dhui in 1876, which appeared to be undescribed in any of the text-books. He had sent a specimen to the Rev. J. Fergusson, who, in reply, stated that the form was not unknown to him, but that he had seen fruit of it for the first time this season. He had named it, provisionally, *Philonotis firma*. With regard to *Hedwigia striata*, exhibited at the last meeting, from near Grasmere, the president said that in looking through Mr. Ashton's collection he had found a fruiting specimen gathered in Llanberis Pass. This was a fortunate discovery, as the moss was extremely rare—three localities only being known for it. It was first found by the late Mr. W. Wilson in 1829, at Llyn Idwal, and named by him *Anectangium striatum*. Another very rare moss, *Tortula papillosa*, was exhibited by the president, having been found on trees brought to Ashton-under-Lyne from the neighbourhood of Welshpool. *Fontinalis gracilis*, which has been a subject of much discussion amongst muscologists, was likewise exhibited. Mr. Holt handed in a collection of mosses from Cressbrook Dale, Derbyshire, including several interesting species, namely, *Bryum Zierii* (barren), *Neckera complanata* (fruit), *Fissidens pusillus*, and *Hypnum chrysophyllum*. Other members exhibited *Ædipodium Griffithianum* (a species peculiar to Britain), gathered upon Snowdon last month ; and the finding of *Andreaea alpestris* in the same neighbourhood, and of *A. falcata*, *crassinervia*, and other species in Llanberis Pass was also mentioned ; but these are to form the subject of discussion at a future meeting. *Rhabdoweissa fugax* and *R. denticulata* were reported to have been found in great abundance this autumn both at Llanberis Pass, at Llyn Ogwen, and in the neighbourhood of Dolgelly.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, Aug. 31st, Mr. T. Scott, V.P., in the chair.—A number of botanical specimens were laid on the table, chiefly common species. The ferns included *Polypodium vulgare*, *P. Phegopteris*, *P. Dryopteris*, *Lastrea recurvum*, *Blechnum boreale*, &c. Mr. J. Spencer showed a few geological specimens, including a new form of *Ulodendron* from the sandstone of Southowram, also a *Dadoxylon* from a baum-pot from the marine beds of the Halifax coal strata ; Mr. T. Hirst, the following birds and animals :—one rough-legged buzzard, pair of smews, pair of hoopoes, one bustard, two white hares from America, a white fox from Scotland, a loriote (sic) and a cormorant, killed at Low Moor.—J. OGDEN, Sec.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, Sept. 3rd, Mr. J. Wainwright, F.L.S., in the chair.—Mr. Wright showed *H. sylvinus*, *C. fulvata*, *T. batis*, *X. citrigo*, *V. urticae*, also larva of *D. vinula*; Mr. Sims, *T. fimbria*, *P. cardui*, *X. citrigo*, *X. scolopacina*, and *X. polyodon*, black variety, a very good specimen.—J. W. SHAW, Corr. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Sept. 10th, Mr. Wm. Chapman in the chair.—Mr. Smith exhibited a fine variety of *Veronica spicata*, with variegated leaves, cultivated; also the following beetles:—*P. horticola* and *P. fasciculus*; Mr. Bacon, the ruff-and-reeve, with eggs (*Machetes pugnax*); Mr. Whitwell, specimens of *Drosera anglica* and *D. obovata*, from Leckby Carr, the latter of which has not been, as far as we know, recorded in Yorkshire before. Mr. Arnold Lees is of opinion that the specimens of *obovata* are hybrids between *anglica* and *rotundifolia*, both of which occur at the same spot; also specimens of the rare *Vicia bithynica*, lately collected by him at Upgang, near Whitby. Mr. Whitwell also showed specimens of fossil plants obtained by him from the fern bed at Whitby, lying upon the Dogger sandstone at the base of the oolitic series. The following genera of ferns were represented:—*Pecopteris*, *Sphaenopteris*, *Teniopteris*, and also specimens of *Calamites* and *Otozamites*. Mr. G. Jackson, fine bred specimens of *Coremia unidentaria*, bred from the eggs; *Larentia olivata* and *casiata*, and *Cidaria populata*, taken at the Pateley Bridge excursion: also *Leucanea obsoleta*, *Nonagria cannae*, *Agrotis cinerea*, and various others.—W. PREST, Sec.

YORKSHIRE NATURALISTS' UNION.—The excursion season of 1879 was brought to a close on Saturday, the 6th of September, by an excursion to Riccall Common (over which there is still hanging the threatened doom of enclosure), followed by a meeting at Selby. There was a fair average attendance, principally from Goole. A few members investigated various other localities about Selby, including the never-failing Bishop's Wood. At the general meeting held at the Londesbro' Arms Hotel, Selby, the business was commenced by Mr. J. T. Atkinson, F.G.S., President of the Selby Naturalists' Society, who offered in their name a hearty welcome. The Rev. W. Fowler, M.A., in the absence of the president, took the chair. Time being limited, some of the business was shortened. On calling the roll it was found that 14 societies were represented, and 13 absent, the individual attendance being about 70 or 80. On the motion of Mr. G. T. Porritt, F.L.S., Huddersfield, seconded by Mr. William Prest, York, a vote of thanks was tendered to Mr. W. N. Cheesman, the secretary of the Selby Naturalists' Society, for his efficient services as local secretary. On behalf of the Conchological Section, Mr. Joseph Wilcock, Wakefield, secretary, reported. For the Entomological Section, Mr. S. D. Bairstow, Huddersfield, secretary, reported a great paucity of lepidopterous insects as compared with the meeting at Doncaster the previous month. The best noticed were *Liparis monacha*, larva of *Acronycta menyanthidis*, and pupæ of *Gortyna flavago* in thistle stems.

Neuroptera, particularly dragon-flies, on the contrary were much more numerous at this excursion; they abounded on the damp parts of the Common.—On behalf of the Botanical Section, Mr. Wm. West, Bradford, secretary, stated that the districts explored were Riccall Common, the woods and ponds adjoining, the ponds at Kelfield, and the river bank from Selby to Turn Head. The number of vascular plants noticed was 313, notably amongst which were four species of *Allium* from the river bank above Selby, viz., *carinatum*, *oleraceum*, *Scorodoprasum*, and *vineale*, var. *bulbiferum*; the four species of *Lemna*, *Helosciadium repens*, *Koch*, *Mentha Pulegium*, *Drosera intermedia*, *D. rotundifolia*, *Gentiana Pneumonanthe*, *Thalictrum flavum*, *Rumex maritimus*, *Arctium majus*, *Pimpinella magna*, *Hypericum dubium*, *H. elodes*, *Bidens cernua*, *Radiola millegrana*, *Salix ambigua*, *S. argentea*, *S. triandra*, *S. viminalis*, *Utricularia vulgaris*, *Nephrodium Oreopteris*, *Sanguisorba officinalis*, *Sium latifolium*, *Rhinanthus eu-major*, *Cenanthe Phellandrium*, *Colchicum autumnale*, and *Stellaria glauca*. Fifty-three species of mosses were observed, including *Sphagnum rigidum*, *S. subsecundum*, *S. tenellum*, *Pottia minutula*, *Bryum pseudo-triquetrum*, *Atrichum tenellum*, *H. Schreberi*, and *H. imponens*. A few *Hepaticæ* were noted, *Riccia glauca* from fields between Selby and Turn Head; six common species of lichens; many species of fungi, not all named. Amongst those that have been named were *Puccinia Amphibii*, *Coleosporium Petasitis*, *Lecythea Saliceti*, and *Agaricus hypnorum*. Many small algæ were collected, *Desmids* being especially abundant. The following are a few of the species collected on Riccall Common:—*Spirogyra nitida*, *S. quinina*, *Arthrodesmus convergens*, *Staurostrum gracile*, *S. furcigerum*, *Euastrum (elegans ?)*, *Scenedesmus quadricauda*, *Ankistrodesmus falcatus*, *Pandorina morum*, *Cosmarium pyramidatum*, *C. margaritifera*, *Tabellaria flocculosa*, *Docidium baculum*, and three species of *Closterium*.—There was no meeting of the Geological Section, but Mr. J. T. Atkinson, F.G.S., favored the general meeting with a brief outline of the geology of the district.—On behalf of the Vertebrate Section, Mr. Thomas Lister of Barnsley, president, stated that, considering the limited range of observation, the vertebrates were pretty numerous. Of resident birds upwards of twenty were observed, the chief of which were—marsh tit, blue tit, twite, greenfinch, grey linnet, lesser redpole, pied wagtail, meadow pipit, moorhen, little grebe, wild duck, heron, teal, kestrel, common bunting, yellow hammer; of migrants (10)—willow warbler, sedge warbler, whinchat, whitethroat, Ray's wagtail, and swift. Of animals, two vipers, the ringed snake, mole, and bat were noted.—The chairman announced that the next meeting would be the annual one, at Huddersfield, on the 17th of January, 1880, and the secretary urged upon the members the desirability of their attending it, stating that the Huddersfield members were arranging to make it unusually interesting. The secretary also requested the members to think over the names of places suitable for next season's meetings.—W. D. R.

Diary.—Meetings of Societies.

- Oct. 1. Wakefield Naturalists'.
" 6. Leeds Naturalists', &c., Entomological Section. Liversedge
Naturalists'. Bishop Auckland Naturalists'.
" 8. York and District Field Naturalists'.
" 10. Huddersfield Scientific Club.
" 13. Manchester Cryptogamic Society.
" 14. Leeds Naturalists', Microscopical Section.
" 16. North Staffordshire Naturalists' Field Club—Excursion to Madeley,
in conjunction with the Manchester Clubs.—Leader, Rev.
T. W. Daltry, M.A., F.L.S., Madeley Vicarage, Newcastle,
Staffordshire.
" 18. Dewsbury Naturalists' Society.
" 21. Leeds Naturalists', Vertebrate Section.
" 27. Lancashire and Cheshire Entomological.
" 28. Leeds Naturalists'.—(General Meeting.
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CATALOGUE OF YORKSHIRE BIRDS.

The compiler tenders his thanks to those who have responded to his request for information as to the *Accipitres*, and would now be glad to receive similar lists with remarks as to the distribution, abundance, breeding and rare occurrences of the first portion of the *Insectores*, comprising the families *Laniidae*, *Muscicapidae*, *Cinclidae*, *Turdidae*, *Sylviidae*, *Troglodytidae*, *Piridae*, and *Ampelidae*, (Shrikes, Flycatchers, Dipper, Thrushes, Orioles, Accentors, Robins, Redstarts, Chats, Warblers, Wrens, Tits, and Waxwing). All assistance will be duly acknowledged by W.W. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

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Original Articles.

NOTES ON THE BUZZARD (*BUTEO VULGARIS*).

BY WM. EAGLE CLARKE.

IN these days of game-preserving when the useful kestrel and owls, and even the magpie and the jay, are to be found in the rank and file of the keeper's enemies, it is not surprising that so large a hawk as the buzzard has ceased to perform those duties allotted to it by Nature for her economy, and to be an object adding to the beauty and interest of most of our woodland districts. This is greatly to be deplored, as it is a most useful bird—a great destroyer of rats, mice, moles, and other animals, which, when they become numerous, are alike prejudicial to the interests of the agriculturalist and landowner. It also preys upon weakly birds and animals, thus furthering Nature's design for the survival of the fittest. But alas! poor buzzard, you are sometimes guilty of snatching a young pheasant—a most heinous crime in this enlightened age! consequently your good qualities are reckoned as nought, and you are doomed to perish, paying penalty to that insatiable tyrant, modern sport.

Among the wild mountain crags of England and Wales (also Scotland, but my experience does not apply to that country), the buzzard's existence is not quite so precarious, though it often falls a victim to the baited trap, and on the moors to the pole trap. This last is a most cruel instrument, and should by right come under the lash of the Society for Prevention of Cruelty to Animals. But even in these secluded wilds its numbers are very limited, and it can hardly be said to be increasing. In the year 1876 I made a special tour in the north of England for the purpose of procuring authentic eggs for my collection, and becoming acquainted with this species in its mountain home; and in the years 1877 and 1878 I had again opportunities of observing it among the Welsh mountains. In these districts its habits, flight, and nidification greatly resemble those of the golden eagle, and when seen on the wing at a distance, it might easily be mistaken for that species. The expanse of wing of one specimen obtained in 1875 was 4ft. 6in. Its food consists chiefly of moles, in the pursuit of which it is to be seen soaring in circles over the fellsides, often at a considerable elevation. It also feeds on carrion in the shape of dead sheep. In winter it ceases to roost on the fells, seeking shelter in the plantations of the lower levels. The character of laziness given to this species by some naturalists cannot here be

N. S., VOL. V., Nov., 1879.

sustained, for the general barrenness of a mountain district precludes the possibility of a lazy bird existing.

The following are extracts from my note-book, made during the 1876 excursions, and will give some idea of the nidification and other habits of this bird :—

May 6th : At the hour appointed the cragsman arrives with his long rope (usually used to extract sheep from inaccessible places), my friend and myself accompany him. Crossing the lake in a boat, we land and ascend the mountain to a spot where it is bi-sectioned by a deep and narrow ravine, at the angle of which a mountain torrent leaps 100ft. below, forming a grand waterfall. Carefully approaching the side, we are gratified by a sight of the old bird as she hurriedly leaves her nest, exposing to our anxious gaze her two eggs. The nest is placed some 15ft. below, on the broad stem of a large mountain ash which springs from the perpendicular side, and is simply a hollow surrounded by stout heather stems, lined with finer heather and dry grass. The eggs are easily procured with the aid of ropes, and are of a dirty white ground colour, sparingly blotched with dull blood red. Altogether the site is beautiful in the extreme.

Descending to the boat, we proceed up the lake for about a mile, and landing on the opposite side, proceed to a second nest, which is situate in an unfrequented valley quite in the mountains, and 1500 feet above the level of the lake. After a climb of an hour-and-a-half we arrive at the site, the precipitous rocky side of a torrent, locally known as a "gill." We again approach from above with caution, and are favored with a glimpse of the old bird as she leaves her nest, which is not visible from above. Being wishful to inspect it, the rope is carefully adjusted, and I reach the nest some 20ft. below, suffering slight inconvenience from the shower of small stones and sand from above ; but I am well prepared for the stones by having our united pocket handkerchiefs in the crown of my hat. The nest is placed on a very narrow ledge, so narrow that it is impossible to stand upon it without support by the rope from above, and is of large dimensions, being quite two feet high and 18in. in diameter—a very compact structure of heather stems of the thickness of one's little finger, lined with finer heather and dry grass. The eggs, two in number, are remarkably clean, with rather more red markings than the last. On the same ledge, a few feet to the right is a nest of former years, of similar construction, and apparently in good repair, placed between the face of the rock and the stem of a slender mountain ash !

The eggs from both the nests proved to be considerably incubated.

May 8th : I am tempted to make a divergence from my subject, and to give the following interesting note on the nesting of the tawny owl. Acting on information I had received last evening, I visited a certain barn, the hay in which reaches to within a yard of the roof, and on the top I find three eggs of the tawny owl placed on a slight depression, and immediately opposite a narrow opening in the wall. The eggs had been forsaken some weeks owing to a curious misfortune having happened to the old bird, which somehow managed to find its way down a chimney into an unoccupied bedroom, where it was found almost starved to death, perched upon a chest of drawers.

In the evening we obtained information of another buzzard's nest, and after a hasty tea set out. The climb being much more stiff than before, it is dusk when we reach the site, which is excessively wild and exposed, being the face of crag at the summit of a pike 2000ft. high, and overlooks a desolate rocky valley whose almost perpendicular sides are strewn with detached rocks. The nest is easy to get at from above, but unfortunately the rope is left behind. The old bird is very reluctant to leave, although we shout and make a great noise, and it is some minutes before she is scared. To my friend and myself this nest is quite inaccessible ; it is, however, reached by our guide in masterly style but at the greatest possible risk. The eggs are two in number like the others, but more liberally dashed with red brown. It is quite dark long before we reach the inn.

May 12th. After climbing one of the wildest passes in England, and crossing an uninhabited narrow valley in which lies a secluded lake, we ascend the opposite mountain and recline to take a little rest, and look back upon the wild valley and mountains. Before us is a celebrated mountain from whose inaccessible sides a buzzard flies ; at first she wings her way with heavy flight, performed by slow deliberate flaps of her broad and powerful wings, she pauses, almost coming to a standstill, and then wheeling, commences to rise by the most graceful and easy gyrations, performed apparently without the slightest effort. Higher and higher the bird rises, until at last she becomes a mere speck in the clouds, and the elevation reached cannot be less than 6000ft. It is the triumph of the wing, and we watch her long, leaving reluctantly to resume our way.

May 13th : We are favoured by a sight which is now-a-days a very rare one in England—a pair of ravens pursuing a buzzard. The ravens, with bills upturned like bayonets and with vigorously flapping wings, are making vain endeavours to reach the hawk, which, as though to tantalise, keeps just above them, rising in very small

circles. Presently the buzzard's mate appears on the scene, and, as if cheered, the pursued one makes a powerful stoop, and the pursuers, just escaping, realise the fact that "discretion is the better part of valour," and hurry away, leaving the buzzard master of the field, or rather the space.

This reminds me of the pair of buzzards mentioned by Thompson (*Nat. Hist. Ireland; Birds, I, p. 73.*) which usurped a raven's nest, the latter birds fought hard, but in vain, the buzzards conquered and reared their young. Both incidents show that the buzzard is possessed of considerable courage, the raven being an enemy not to be despised.

May 15th : After searching for sandpiper's eggs on the lake side, we ascend a bold crag which overhangs its surface and which is some 300ft. high. This is a favourite haunt of the buzzard, and after a short search we succeed in putting the old bird from her nest; she does not make off as before, but perches on a mountain ash just above the nest. Having procured the rope and appearing again above the nest, the old bird leaves, uttering a loud and plaintive cry which has something remarkably cat-like about it; this she continues to do, flying backwards and forwards over the lake, until she is joined by her mate who appears mysteriously from far above, and then both sail quietly away. My friend is lowered to the nest which is in the face of the crag, about 40ft. from the top, and placed in a little cave in the rock, with a slender mountain ash springing immediately from its front. The nest is similar to those already visited by us in construction, and again contains two eggs, one of which is a very beautiful specimen, being dashed with neutral tint besides the usual reddish-brown markings.

During my visits to Wales I often observed the buzzard hunting, and sometimes hanging as it were almost motionless over the fell sides. I am sorry to say that during the thirteen months that elapsed between my first and second visits the keeper had shot and trapped no less than fourteen birds; one of these I imagine from his description to have been a rough-legged buzzard, which, so far as our county is concerned, is the commoner bird of the two, although only occupying the position of an autumn visitor on the British list. A young common buzzard obtained in Wales was useful in the garden, and would follow anyone digging, for the sake of the worms.

In conclusion, I would remark that, taking into consideration the habits, build, flight, &c., of the buzzard, which seem to be so much akin to the eagle, and also the fact that the rough-legged buzzard

shares with the golden and spotted eagles the peculiarity of being the only British members of the family *Falconidæ* that are feathered to the foot, I should be inclined, were I competent to be a systematist, to place the genus *Buteo* next to that of *Pandion*, that is before the true falcons, the hawks, and the kites, which now intervene. But I rest quite content in knowing that those worthy of being looked up to as authorities have ordained otherwise, and I accept their decisions.

Leeds, October 20th.

ON SOME CAUSES WHICH SEEM TO OPERATE IN THE
PRODUCTION OF VARIETIES IN LEPIDOPTERA.*

BY S. L. MOSLEY.

Now that I have examined almost every large collection of lepidoptera in England, for the express purpose of picking out those which differ more or less from the normal type, it may not be out of place if I throw out a hint or two as to some of the causes which seem to me to operate in the production of these varieties. The subject is as yet very obscure, and we require a great deal of facts and data before we can attempt to form any theory as to the uses or purposes of these variations. Some of them may seem clear and certain both as to their use and the cause or causes which produced the variation, but we have yet a great deal to learn ; and it is only by each one telling what he knows—and only what he knows—that we can hope to arrive at any definite or satisfactory solution of the problem.

Some species of lepidoptera seem very constant, and we scarcely ever find anything differing from a given standard line in colour, or arrangement of pattern on the wings. Who, for instance, ever saw a var. of any of the *Sesidæ* except the white-belted *culiciformis*?—always the same transparent wings, and bodies belted with either red or yellow ; or of any of the genus *Procris*?—always the same uniform brassy green ; or of any of the *Lithosidæ*? Of course slight varieties have now and then occurred even in these, but as a general rule they are very constant, and anything approaching to a variety is very rare. A great many of the *Noctuæ*, too, seem remarkably constant in their characters ; others, on the contrary, seem to have an almost everlasting change of colour or pattern : and I might give as instances two favourites of the variety-breeder, *Chelonia caja* and *Abraxas grossu-*

* Read before Huddersfield Scientific Club, Oct. 10th, 1879.

lariata. To these I might add *Hepialus lupulinus*, *Chelonia plantaginis*, *Arctia lubricipeda*, *Bombyx quercus*, *Fidonia atomaria*, *Lomaipilis marginata*, *Hybernia defoliaria*, *Cidaria immanata* and *russata*, *Apamea oculea*, *Tœniocampa instabilis* and *opima*, &c. Some vary regularly and constantly in one given way, either to dark or light, but generally to dark,—as *A. Paphia* var. *Valezina*, *T. biundularia* var. *Delamerensis*, *A. aversata*, banded form, *Hybernia leucophearia* var. *nigricaria*, and the dark-bordered form we get generally, ; *H. progemmaria* and *defoliaria*, a dark unicolorous form of each of which we get here : *Stauropus fagi*, *Arctia fuliginosa*, dark Scotch form ; *A. rumicis*, var. *salicis*, *X. rurea*, var. *combusta* ; *X. polyodon*, dark form ; *T. orbona*, var. *Curtisii*, &c. Or to light, as *Colias Edusa*, var. *Helice*, *C. Hyale*, pale form of female, and pale females of all other species of the genus *Colias* ; *P. phloœas*, var. *Schmidtii*, *Z. filipendulæ*, var. *hippocrepidis*, and *trifolii*, yellow var. ; *Lithosia griseola* var. *stramineola*, *C. plantaginis*, var. *hospita*, *Xanthia cerago*, var. *gilvago*, Haw., &c.

Some varieties seem to be influenced by latitudinal or altitudinal distribution : var. *Hospita* and var. *Merope*, for instance, are considered alpine forms, while the dark *Polyodon*, *Duplaris*, *Occulta*, and *Orbona* are looked upon as northern forms, and vars. *Valezina*, and *Diniensis* as southern forms.

Out of a list of 79 species of British macro-lepidoptera, which I made out as being subject to produce varieties, 37 had a tendency to vary from light to dark, while only 18 had the opposite tendency to vary from dark to light, and 24 had a tendency to vary in both directions. Of the latter (those which varied in both directions) 14 had a majority of specimens for the dark, five had a majority for the light, and five varied in both directions in about an equal degree. Of those species having a tendency to produce varieties darker than the type, 24 had produced dark varieties which may be said to be persistent and for the most part named, while among the light varieties only 11 had become established. Amongst the dark varieties, some, as *Occulta*, *Duplaris*, *Belgiaria*, *Fuliginosa*, &c., seem confined, if not to Scotland, to the northern portion of our island, which seems to go against the generally admitted rule that cold is productive of a bleached appearance ; hence some other cause must be assigned which acts stronger than the bleaching influence of the cold in these cases. A striking instance is found in *V. urticæ*, where we find it in the south (*Ichnusa*) lighter than the type, and in the north (*Polaris*) darker than the type, but these are exceptions to the general rule which under our present state of knowledge we cannot account for.

All kinds of animals found within the arctic circle have a tendency to whiteness or uniformity of tint. In insects, look at many of the arctic species of the genus *Colias*; as compared with the more southern ones the tints are more sombre and more uniformly diffused over the wings—*Nastes Boothii*, &c.; and though the dark *Polyodon*, or the dark *Occulta* or *Duplaris* from Scotland, may be darker than the same species from the south of England, yet the tint is more uniform, and may serve as much for a protection in the peat bogs as the whiteness of the ptarmigan or snow bunting does on the mountain top. But it is curious, nevertheless, that a great proportion of varieties are darker—and sometimes considerably darker—than the type. Look, for instance, at the black variety of *Betularia*; and the dark form of *Biundularia* in Delamere Forest. It is strange, too, that at a certain place in Durham, many of the larvæ of *Grossulariata* are black, or very nearly so. I am not aware that this is the case in any other part of England, and I can at present only suppose that this is brought about by some process of natural selection, some enemy having taken a fancy to the larvæ of *Grossulariata* in this particular district, and the blackness serving as a protection among the black stems of the currant-bushes; and this view seems the more probable from the fact that the imagos in no way differ from the ordinary form, which might not have been the case if the variation had been due to meteorological or chemical causes.

It is said (*Ent.* x., 132) that dry and withered food has a tendency to produce small dark specimens, and that *A. betularia* or *A. grossulariata*, when fed in this manner, becomes black in a few generations. If this be the case, it may in some degree account for some of the dark varieties which predominate to such a degree over the light ones, both in a state of nature and in confinement. In many cases I find that some particular variety was bred from the only larva collected. Mr. Porritt has a very dark *Quercus* which was bred by a non-entomological relation of his, and might have been neglected and obliged to eat withered food; it also remained in pupa two years before emerging. I have only seen another specimen of this variety, which is in the British Museum.

There can be very little doubt that many varieties, or local races, are produced by natural selection, and the best instance I know of is *Gnophos obscurata*. This insect has the habit of settling on the ground like *Belgiaria*, and those individuals which differ most from the colour of the ground become the easiest prey to the birds; hence on the black peat we find a very dark insect, while on the chalk they

are pale, sometimes simply with only two dark lines running across the wings. Between the chalk and the peat they are intermediate, and on the clay mud the insects are an ochreous mud colour. The same takes place in *Thanaos tages*, and no doubt many other species, if properly examined, would be found to vary according to their particular habitat. As a case of that kind I might mention *Polia chi* and the var. *olivacea*, the latter being found chiefly on the dark walls near the moor edges. Yet there must in some cases be some other agent at work than that which we know as natural selection, for Mr. Darwin has shown that the pupa of *P. Nireus* will assume the colour of almost anything to which it attaches itself; and Miss Golding-Bird (*Ent.* xi., 108) tells us that the larvæ of *C. nupta* and *Biston hirtaria* are dark or light, according to their surroundings, even when kept in confinement, where no known process of natural selection could operate.

I have said that cold and shade have a tendency to produce dull, indistinctly coloured specimens; we must therefore suppose that sun and warmth have the contrary effect of producing bright, distinct colours, and Mr. Bond told me of an instance which seems to bear out this theory remarkably well. Mr. Bond obtained eggs from an ordinary female of *Sterrhæa sacraria*, and during the time he was carrying them through their transformations there was scarcely any sunshine at all—the dullest weather possible. The previous year Mr. McLachlan had obtained eggs from another ordinary female of the same species, and they were brought to maturity for him by the Rev. E. Horton; but during the time these were feeding up and coming to perfection the sun shone brilliantly almost every day. These two lots did not differ two days from the time of the eggs being deposited to the time of the appearance of the first imago, yet Mr. Bond's were very dark, dull specimens, without the slightest tint of rosy, and Mr. McLachlan's, with a single exception, were very bright with more than an average of rose tint. Of course I do not say that in the one case the dull weather produced the dull specimens, or that in the other the bright sunshine produced the bright colours; but the two cases are very suggestive, and harmonise very well with my ideas of light, heat, and colour.

That light has some influence on the colours of lepidoptera I think there can be little doubt. Mr. Sidebotham (*Sc. Gos.*, Dec., 1869) procured a large number of *V. urticae* when quite small and fed them up in three lots, one under blue light, one under yellow, and one under ordinary light. "These reared in the blue light differed from

the ordinary form in being, on an average, much smaller; the orange brown lighter in shade, and the yellow and orange run into each other instead of being distinct and separate." "Those reared in the yellow light were also smaller, the orange brown replaced by a salmon color, the venation more strongly marked, and the blue dashes at the edge of the wings in the usual form were in these of a dull slaty color." The colours of butterflies which fly in the sunlight are more brilliant than those of the *Geometræ*, which fly at dusk, and the *Geometræ* are brighter-coloured than the night-flying *Noctuæ*. The sun-loving genus *Plusia* is the most brilliant of all the *Noctuæ*, and the hotter the climate the brighter the colour both of insects and birds. Look at the gorgeous beauty of some of the *Ornithopteræ*, and especially the *Uranix*, which latter seem to me to be day-flying *Geometers*, though Newman states they are true butterflies of the "skipper" family. The under side of butterflies, which is as much exposed as the upper side, is often quite as gaily coloured. But there are some cases which seem to be exceptions to this rule. In the genus *Catacola* the under wings are brightly coloured, while the upper wings are simply sombre grey. These insects rest by day on the trunks of trees, with the upper wings overlapping the lower wings, and they fly in the night, so that the under wings do not come in contact with the sunshine at all, yet they are the brightest parts about these insects. A similiar case occurs in the genus *Tryphæna*, where the under-wings are bright orange, though completely hidden during the day and only exposed during the night. At present I am inclined to the belief that these may be lingering descendants of a day-loving and more brightly coloured race. The genus *Catacola* is, in fact, only one degree removed from the *Geometers*, many of which fly during the day. The genera *Plusia*, *Brephos*, and *Gonoptera*—all brightly coloured insects—belong to the same class.

(To be continued.)

Short Notes and Queries.

PERCHING OF THE REDSHANK.—In the *Naturalist* (vol. V., page 10) Mr. Clarke observes in a note on the perching of the redshank on trees, that it is no uncommon sight on the continent to see this species, as well as others of this order, perched on trees. In speaking of the non-observance of this habit in this country he correlates the fact with the absence of trees in their haunts. From observations which I have made in this district I am certainly led to a different conclusion. For many

years the common sandpiper has bred annually at the Manywells reservoir, and although its banks are fringed with trees, at least half-way around, and this is the part they more particularly affect, I have never observed them alight, even once, on trees. When the reservoir has been full I have several times seen them traverse its whole length in search of a suitable perching place. A pair of sandpipers, however, which my brother and I saw in the Goit Stock Valley in the summer of 1876, and which were evidently breeding, perched on the lower branches of trees with great facility, bobbing their tails up and down as they flew from tree to tree, much after the manner of wagtails. This idiosyncrasy cannot be explained, I think, on Mr. Clarke's theory, since the physical aspect—at least in its arboreal character—of the locality in the Goit Stock Valley differed in no material respect from Manywells. Would it afford a sufficient *eclaircissement* of the matter to presume that the above birds were of continental extraction? Another instance I may cite, although belonging to another order of birds, without perhaps being thought irrelevant to the point at issue: A skylark's nest was built about half a mile from this village, near the old main road leading to Bradford: when the nest contained young I used to see one of the old birds (I think it was the female) frequently alight on the top of a high whitethorn hedge about forty or fifty yards from the nest. This deviation from its usual habits was in no way connected with exceptional physical conditions; within about ten yards from the nest was a wall which bounded the main road, yet it as frequently alighted on the hedge as on the old wall. It is therefore, obviously not for lack of apparently suitable perching places that this abnormal habit can be accounted for. Nevertheless I am free to confess that birds are by no means mere automata, impelled in all their movements by blind instinct, but in some of their actions there appears to be indications of the faculty, if not of reason, at least of something very near akin to it.—E. P. P. BUTTERFIELD, Wilsden, September 10th.

DUSKY PETREL.—I had a specimen of the dusky petrel (*Puffinus obscurus*) brought to me to stuff on Friday evening last; it is a male bird in splendid feather. I think it as well to record this, as it is not in the "List of the Birds of Wakefield" as published in the *Naturalist*.—J. SPURLING, 42, Northgate, Wakefield, Sept. 14th.

GREAT-CRESTED GREBE, &C., NEAR GOOLE.—Three specimens of this bird have been shot on the Ouse during the last three weeks. Mr. Richardson reports the arrival of the redwing on the 1st inst.; he saw the chiffchaff the preceding day, and, shortly before, three young water-rails and the parent bird. He states it to be the first time during fifty years he has seen the young of the last-named bird. I saw the house martin on the 12th, but have not observed it since.—THOMAS BUNKER, Goole, 14th Oct.

KITE v. BUZZARD.—Those who have seen both the kite and the buzzard can never mistake the one for the other, and I am inclined to think, from Mr. Butterfield's description, that Mr. Clarke is right. I never saw the kite with a white head ; I have seen many with light-coloured heads, but they are always inclined to a reddish brown ; and the tail of the kite is so much longer than that of the buzzard, that in any position it cannot be mistaken for that of the latter.—JAMES VARLEY, Almondbury Bank, Huddersfield, Oct. 18th.

THE POCHARD AT HUDDERSFIELD.—On the 15th inst. I had a fine specimen of the pochard (*Fuligula ferina*) brought to me, shot on Mr. Day's dam, Almondbury Bank. It is a male bird, in fine plumage. In the evening of the same day I heard a flock of birds passing over,—evidently ducks, from the whistling of their wings.—JAMES VARLEY, October 18th.

SCARCROFT BIRDS.—I always take a great interest in local lists of birds, but I am rather surprised at one or two remarks in Mr. Hay's Scarcroft list. In all my long experience of birds I never saw the grey wagtail follow the plough in winter. It is generally observed in some solitary place near a stream where leaves or other refuse have accumulated, but rarely in fields, unless where water runs down and rubbish has accumulated. If we follow it to its breeding-place, we find that it loves some solitary glen where there is a waterfall, and where the golden saxifrage and other aquatic plants grow. If disturbed, it always utters its plaintive note, "Twit, twit?" I often see the pied wagtail following the plough in winter, and its young are grey. Mr. Hay also gives the blackcap warbler as common, and omits the garden warbler altogether, the latter being much the commoner of the two. Early in July I spent a day in and about Roundhay Park, near Leeds, and I had the pleasure of hearing three garden warblers, but only one blackcap. Their songs so much resemble each other, that they are often taken one for the other. The song of the blackcap is more broken, and not continued so long as that of the garden warbler.—JAS. VARLEY, Oct. 18th.

CROSSBILL AND TURTLE DOVE BREEDING NEAR YORK.—Though the crossbill retires to northern latitudes to breed, still there are a few instances on record of its staying, and nesting in England. Every authentic instance should be recorded, as this bird may stay here more often than is generally thought, but on account of it nesting so early in spring, it has very rarely been noticed. Mr. Widdas, whose name has been mentioned before in the pages of the *Naturalist*, found this bird's nest in a fir plantation, at Stockton-on-Forest, near York. He and his friend were bird-nesting very early in spring, in the plantation, when Mr. Widdas saw, as he thought, a greenfinch's nest built in a fir tree. Immediately he began to ascend the tree, out flew a strange bird. The nest contained four eggs, which Mr. Widdas was unable to identify at the time, but afterwards found to be those of the crossbill. The nest, which

was placed half way up the tree, where a branch joined the trunk, was larger and of a flatter form than that of the greenfinch. It consisted of a foundation of small twigs, lined with leaves, dried grass, and hair. The eggs which are now in my collection, are larger than those of the greenfinch. There are two distinct varieties, leading one to suppose that they must be the produce of two different birds. Two of the eggs are of a cream colour, thickly spotted especially towards the larger end with dark red and light grey. I have also eggs of the turtle dove taken from a plantation at Acomb; four nests were found within a short distance of each other. The turtle dove's nest is seldom found so far north as York.—W. RAINE, October 18th.

ABUNDANCE OF *Lithosia quadra* IN THE NEW FOREST.—Larvæ of *Lithosia quadra* actually swarmed in Matley Wood this season; you could not walk without destroying numbers, and upwards of a hundred were counted on the trunk of a single tree. Larvæ of *Cleora glabraria* were also more abundant than I have ever before seen them; and *Eurymene dolabraria*, *Tephrosia consortaria*, and *T. extersaria* were tolerably abundant. I have also *Acronycta alni*, and nineteen *Stauropus fagi*, the latter from the eggs.—J. G. ROSS, Bath, September 20th.

Stauropus fagi AND *Acronycta alni* IN GLOUCESTERSHIRE.—Yesterday I took a half-fed larva of *Acronycta alni*. Some months back I found a fine female *Stauropus fagi* at rest on a beech trunk.—A. E. HODGSON, Coleford, October 7th.

Bulimus obscurus var. *alba* IN YORKSHIRE.—In the *Naturalist*, vol. v., p. 22, Mr. H. Pollard claims to be the first recorder of this shell in Yorkshire. We are sorry to have to correct Mr. Pollard in this respect, but we feel quite sure that he will take the correction in the spirit in which it is given—namely, with all friendliness. In looking over an old file of the first issue of the *Naturalist*, in vol. iii. (the last issued), page 98, Nov., 1866, we find a note on some “Land and Fresh-water Molluscs collected at Knaresbro’ and its vicinity by Mr. J. Blackburn, of Leeds.” In this list occurs the shell named, thus:—“26. *Bulimus obscurus* var. *alba*, Grimbald Crag, found by Mr. Beevers in my presence.” Another shell in this list, also from Grimbald Crag, may be worth mentioning, as appended to it is this note:—“Mr. Jeffreys says it has not been found in Britain”: it is *Helix lapicida* var. *albina*.—Eds. *Nat.*

ABNORMAL PLANTS.—The past year has been very productive of botanical monstrosities, owing, no doubt, to the lateness of the season and to the great quantity of rain which has fallen. I found one specimen of the common ribwort (*Plantago lanceolata*) in which each of the scapes bore three spikes. The two outer ones were quite as large as those of the normal plant, but the inner one was very small, and apparently diseased. In another specimen of the same plant, which is very liable to variation, the scape bore three leaves in the usual situation of the spike. The Dutch clover (*Trifolium repens*).—A curious abnormal condition of this plant has

been very frequent ; in this the petals and essential organs exhibited a tendency to return to the foliar state, many heads presenting, on a small scale, exact counterparts of the trifoliate leaves of the stem (see *Science Gossip* for Sept. and Oct.) I have found the same plant (*T. repens*) in a viviparous condition. A branched variety of *Lolium perenne* (*ramosum*,) has been frequent ; I found one specimen with six branches. White flowered varieties have been not unfrequent. The following is a list of those which I have observed :—*Viola odorata*, *Campanula latifolia*, *C. rotundifolia*, *C. glomerata*, *Digitalis purpurea*, *Anagallis tenella* : thus, purple, blue, or pink flowers appear to be the most liable to produce *albino* varieties.—J. A. WHELDON, Northallerton, 4th Oct.

CORRECTION.—In the account of Montagu's harrier breeding near York, in last month's number of the *Naturalist*, instead of "Lupton-on-Forest" read "Stockton-on-Forest." And instead of the nest being "8ft." above the ground it should be "2ft." The harrier's nest is seldom found 3ft. above the ground.—W. RAINE.

NOTE ON A CORRECTION (p. 43, Oct.).—Permit me to say that *Ulota intermedia*, Schpr., is a moss of the Wetherby district, and that therefore the name in the Wetherby list—which I assisted Mr. Wesley to draw up—is no error. *Ulota intermedia* is one of the comparatively recent Schimperian segregates, and is the commonest species of the genus. It was amongst the first examples, almost, of mosses gathered by Mr. Wesley, who, early in 1878, sent me a tuft taken from off the bole of a young tree in some wood between Wetherby and Bramham, I believe, but the exact spot I do not know. It was labelled "*Orthotrichum* (?)" and I marked it *crispum*, and so thought it until later, when I found the same moss in woods near Market-Rasen, plentiful there on young ashes. Mr. Boswell determined the species for me, and pointed out the differences between it and *crispum* and *Bruchii*, with one or other of which it has doubtless been confused, since (I repeat) it is a more widely distributed and commoner moss than either. I inserted the name in Mr. Wesley's list in place of *U. crispum*, which I have not seen from the district.—F. A. LEES, Wetherby.

CORRECTION AND ADDITIONS. —The *Atrichum tenellum* reported for the Riccall meeting should have been *A. undulatum*. The following algæ were accidentally omitted from the Riccall list :—*Penium Brebissoni*, *Sphærozozma vertebratum*, and *Gonium tranquillum*. The *Euastrum* queried *elegans* is true *elegans*. *Barbula papillosa* might be added to the Wetherby list of mosses, as I have gathered it between Knaresbro' and Wetherby. To the list of algæ of the Leeds district, published last month, may be added the following species :—*Oscillatoria muscorum* (Allerton), *Penium Brebissoni* (Riccall), *Chætophora tuberosa* (York, Baildon, &c.), *Campylodiscus costatus* (Bingley), *Euastrum elegans* (Riccall), *Cosmarium crenatum* (Arncliffe), *Tabellaria ventricosa* (Adel),

Gonium tranquillum (Riccall), and *Chroolepus aureum*, which is, according to the latest German authorities, classed with the algæ. It occurs on rocks, walls, and in quarries, near Bolton Woods, on all our N. W. Yorkshire hills, and is abundant in the quarries near Wetherby, &c. There are also above 40 more W.R. species in a list now going through the press, in the Transactions of the Yorkshire Naturalists' Union for 1878. I may add that it is very instructive to compare the zygospores of the *Cosmarium* with species of *Pediastrum*.—WM. WEST, Bradford, Oct. 17th.

Rainfall for September.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·57	17	23·25	* 23·63	21	0·27
LEEDS ... (H. Crowther) ...	183	2·05	16	...	...	8	0·36
HALIFAX... (F. G. S. Rawson)	360	3·06	17	34·05	33·78	...	...
BARNSELY ... (T. Lister) ...	350	1·14	15	24·13	20·88	8	0·23
INGBIRCHWORTH (do.)	853	2·40	17	30·47	31·17	8	0·51
WENTWORTH CASTLE (do.)...	520	2·07	15	26·93	21·14	7	0·68
GOOLE ...	25	1·79	12	20·48	17·40	9	0·36

* This is the average to date for 13 years, 1866-78.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Oct. 16th.—The first of a series of papers arranged by the council to be delivered during the session, was read by Mr. A. R. Kell, C.E., on crows, jays, flycatchers, and kingfishers, with choice and varied specimens of their eggs, and illustrations of the birds and their nests. The botanical section had prepared a copious list of the flowers gathered during the last few weeks, mostly within a five-mile radius of Barnsley, and some from a distance. The entomological and geological sections also gave in their reports; some of their researches had been well rewarded. In ornithology the observations are few, but not without interest. The summer migrants noted are—swift Sept. 8th and 14th (a late stay); the willow warbler Sept. 20th. (The latter bird sang a few days previously; it is reported near Wakefield Sept. 25th.) The whinchat Sept. 26th; Ray's wagtail 27th. The sand and house martin were also observed in numbers on that date over the Calder at Wakefield. Three landrails were obtained

as late as Sept. 27th, near this town. Mr. Hailstone states that the first flock of wild geese visited Walton Park Sept. 13th, and a pair of curlews Sept. 22nd. Several wild geese, ducks, and gulls have flown over Barnsley, chiefly to S.W.; some have settled on our reservoirs and streams—as pochards, and wading-birds like the ringed plovers and sandpipers. That rare falcon, the hobby, was obtained near Waketfield, Sept. 13th; a white sparrow was seen at Pindar Oaks on the 21st; and a sparrow hawk was observed chasing a thrush (which fortunately escaped) in the plantations near Barnsley, Oct. 12th—an occurrence rarely noted here.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Sept. 16th, the president in the chair.—Mr. J. A. Douglas, F.R.M.S., read a paper on “Some of the properties of Matter.” Mr. H. T. Soppitt exhibited *Pyrola arenaria*, *Honkenya peploides*, *Carex arenaria*, *Trifolium fragiferum*, *Eryngium maritimum*, *Ranunculus hirsutus*, *Aster Tripolium*, *Apium graveolens*, *Hottonia palustris*, &c., from the Lancashire sand hills; *Verbena officinalis*, *Senecio viscosus*, &c., from Great Orme's Head; Mr. Wm West, *Trichomanes radicans* from Ireland, *Woodsia ilvensis* from Norway, and *Gymnogramme leptophylla* from Jersey; Mr. Illingworth, *Satyrus Semele* from Blackpool. Messrs. Wardman and Hodgson showed a number of local insects.

MEETING Sept. 30th, the president in the chair.—Mr. Soppitt read a paper on “Field Botany.” Mr. Brown sent for exhibition a beautiful collection of marine algæ. Mr. Jagger shewed a nice series (bred) of *C. sagittata*. Messrs. Buttersfield sent *C. prunata* and *X. cerago* from Bingley, new to the district record list; and Mr. Cooper showed larvæ of *N. dromedarius* from Chellow-Dean, also new to district record list. Other local insects were shown by Messrs. Firth, Carter, and Wardman.

MEETING Oct. 14th, Mr. Illingworth in the chair.—Mr. Spencer read a paper on “Old Garden Plants.” Mr. West showed *Jungermannia gracillima*, *J. ventricosa*, *Didymodon flexifolius*, and *Hypnum uncinatum*, from Bingley; Mr. Soppitt, *Lecythea saliceti*, and some flowering plants from Saltaire. Messrs. Cooper, Hodgson, Crawshaw, Illingworth, Wardman, and Wilkinson showed local insects, including *P. V-aureum*, *P. chrysitis*, *S. dubitata*, &c.—J. W. CARTER, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—The president in the chair. Mr. C. C. Hanson showed the following botanical specimens: *Stachys sylvatica*, *Teucrium scorodonia*, *Bidens tripartita*, *Echium vulgare*, *Lactuca muralis*, and *Anthemis cotula*. Mr. B. Garside, eggs of guillemot, razor-bill, and emu.—W. HY. STOTT.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting October 10th, Mr. S. L. Mosley, vice-president, in the chair.—The chairman exhibited the larva of *Erastria fuscula* from Plymouth; Mr. G. T. Porritt, various lepidoptera he had taken at Skegness in July last, including *Nonagria elymi*,

Nudaria senex, *Herminia cribralis*, *Pelurga comitata*, *Pterophorus pterodactylus*. With the aid of the microscope Mr. George Brook, ter. beautifully mounted slides of *Sida crystallina*, *Actinosphaerium Eichornii*, *Globigerina bulloides*, mounted by himself ; and *Batrachospermum moniliforme* (stained), *Spirogyra nitida* (stained), showing nucleus and chlorophyll grains, *Stemonites fusca*, and "sieve-tubes" from tissue of vegetable marrow—all wonderfully executed by Mr. Thomas Hick, B.Sc., of Harrogate. The chairman then read a paper on "Some Causes of Varieties in Lepidoptera" (see page 53).

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, Mr. W. H. Pearson in the chair.—The hon. secretary (Mr. Rogers) read a communication he had received from Mr. Stewart of Belfast, accompanying which were a number of rare and interesting mosses gathered in the north of Ireland. Amongst them were *Seligeria pusilla* and *S. calcarea*, found growing upon calcareous or chalk rocks in the neighbourhood of Belfast ; *Glyphomitrium Daviesii*, gathered in beautiful condition upon trap rocks at Fair Head, County Antrim ; *Tortula papillosa*, *Brachyodus trichodes*, *Pottia asperula*, and *Hypnum Teesdalii* also formed part of Mr. Stewart's contribution, and were a source of much interest to the members present. Mr. Wild exhibited a moss—*Camptothecium fallax*—new to science, recently discovered at Aix, Provence ; also fine plants of *Hypnum Teesdalii*, gathered at Miller's Dale in Derbyshire. *Dicranella varia*, var. *callistoma*, gathered by Mr. Percival at Freiog, near Barmouth, in August last, was also exhibited. Mr. Pearson read a short paper on *Cephalozia Schlmeyeri*, Cog., and exhibited specimens of *Aneura pinnatifida*, Dmrt., collected by Mr. Carter, Huddersfield ; *Lejeunia calcarea*, Lib., collected by Mr. Whitehead near Litton, Yorkshire ; and microscopic slide of *Jungermannia elachista*, Jack., a species recently added to our flora, having been found in Ireland by Prof. Lindberg and the late Dr. Moore. The British *Andrææ* formed the subject of a paper by Mr. Cash, who exhibited six of the nine species which are known to be indigenous to Britain, gathered by him upon Snowdon and the neighbouring heights in the month of August. The species in question were—*A. petrophila*, *A. alpestris*, *A. alpina*, *A. rupestris*, *A. crassinervia*, and *A. falcata*. The three remaining species were also shown, and the specific differences pointed out.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, October 1st, Mr. Wrigglesworth, v.p., in the chair.—Mr. Sims exhibited bred specimens of *E. fuscantaria* and *E. cervinaria*, also a variety of *C. trapezina* ; Mr. G. Wilson, a pair of *A. grossulariata*—one showing the ordinary type form, and one an extraordinary black variety bred by Mr. E. Wilkinson of Wibsey, near Bradford, and presented by him to the exhibitor. Mr. J. W. Shaw showed several species of hymenoptera, and Mr. Wrigglesworth *Rhagium inquisitor*, *R. indugator*, *R. bifasciatum*, *Saperda carcharias*, *S. scalaris*, also the rare *Emus hirtus*.

Diary.—Meetings of Societies.

- Nov. 4. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
" 5. Wakefield Naturalists'.
" 6. Bradford Scientific Association.
" 7. Leeds Naturalists', &c.
" 10. Manchester Cryptogamic Society.
" 12. York and District Field Naturalists'.
" 13. Bradford Scientific Association: Paper, "Theory and Construction of the Microscope," No. II.—J. E. Wilson.
" 14. Leeds Naturalists', &c. Huddersfield Scientific Club.
" 20. Bradford Scientific Association: Paper, "The Baltic."—A. Crebbin.
Dewsbury Naturalists' Society. North Staffordshire Naturalists' Field Club—Meeting at Hanley.
" 21. Leeds Naturalists', &c.
" 27. Lancashire and Cheshire Entomological.
" 24. Bradford Scientific Association, Microscopical Evening.
" 28. Leeds Naturalists', &c.
-

CATALOGUE OF THE BIRDS OF YORKSHIRE.

Information is earnestly requested relating to that portion of the Order *Passeres* contained in the following genera: *Laniidæ*, *Muscicapidæ*, *Oriolidæ*, *Cinclidæ*, *Turdidæ*, *Sylviidæ*, *Troglodytidæ*, *Certhiidæ*, *Sittidæ*, *Paridæ*, *Panuridæ* and *Ampelidæ*, (Shrikes, Flycatchers, Oriole, Dipper, Thrushes, Warblers, Wren, Creeper, Nuthatch, Titmice, and Waxwing). It is hoped that contributions will be sent from all parts of the county, giving not merely a list, but if possible, and it is desired, remarks on the residents, migrants, rare and occasional visitants, &c., &c.; also the absence or rarity of any common species in certain districts, and the boundaries of the districts alluded to in all cases. The compiler is particularly anxious to work out the distribution of species. All assistance will be duly acknowledged by Wm. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

N.B.—Similar remarks on the *Accipitres* acceptable, and will be in time for the revision of that order.

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Original Articles.

ON SOME CAUSES WHICH SEEM TO OPERATE IN THE PRODUCTION OF VARIETIES IN LEPIDOPTERA.

BY S. L. MOSLEY.

(Concluded.)

ONE exciting cause in the production of varieties, no doubt, is the food-plant of the larvæ, but entomologists make mistakes in supposing that wonderful results can be brought about by this means in a single generation. *Bombyx quercus* fed upon ivy, has a tendency to become destitute of scales; bullfinches fed upon hemp seed become black, and primroses planted in cow-dung turn red. Several closely allied species of moths might be referable to a change in the food-plant of the larvæ. Not that I wish to question their distinctness as species, but I think that a forced or accidental change in the food carried on from generation to generation might have been a means of bringing about their differences. I may instance *E. linariata* and *pulchellata*, *Procris statice* and *geryon*; and we seem to have something like proof in the case of *E. minutata* and *knautiata*, for in the place where *knautiata* is taken they tell us that ling and *minutata* used to be found, and that the ling has since disappeared, and it seems probable that the insects were driven from the heather to the flowers of *Knautia arvensis*, and that *knautiata* is a species as good as some that I might mention, caused or greatly influenced by a change in the food of the larvæ. I grant that some experiments seem to show that food has no influence in the production of varieties. For instance, Mr. Sidebotham (*Sc. Gos.*, Dec., 1869) procured 2,500 larvæ of *C. caja*, and fed them in six different lots—one on willow, one on butter-burr, one on hawthorn, one on plum, one on dock, and another on various kinds of low plants. The result of this was, that “the variations in colour and markings were not to be traced in any case to the food.” Another similar attempt is recorded (*Ent.* ix., 251) from France, in which 5,000 larvæ of *C. caja* were obtained, and fed in different lots on walnut, horse chestnut, sumach, box, celandine, carrot, and lettuce, and some were reared in complete darkness. But all this proved nothing further than that those fed upon lettuce were dull, discoloured specimens, which might have ended in something if lettuce had been continued for a few generations; for we generally find that those insects which feed upon succulent plants having a great deal of water in their tissues, or which frequent marshy land, are pale discoloured

insects like the genus *Leucania*, *Pieris*, &c. But, on the other hand, Mr. Cole is reported to have bred a series of *Ennomos angularia*, which differed slightly according as the larvæ were fed upon oak, thorn, lime, or lilac. It might be that in some cases a variety is caused by some disease or want of energy; and it is worthy of note that many varieties either never leave the pupa case, or are crippled. We frequently find plants single shoots of which are either variegated or completely white, and the cultivator has often taken advantage of this, and propagated the variation. I have particularly noticed in the common dock that some portion of the leaves of some particular plant has been variegated with white or yellow, frequently divided in each leaf by the midrib, one half being green and the other half yellow. The common cultivated geranium will often send out a branch upon which all the leaves are white; and I know a gardener who has frequently cut these branches off and tried to grow them separately, but hitherto they have always withered and died, whereas if he had cut off an ordinary green branch, probably it would have grown without any hesitation—seeming to show that the white branch was diseased or had a want of energy. This want of energy seems to be present in those insects which are unable to burst from the pupa case, or, having burst therefrom, are unable to expand their wings to maturity. The two cases seem to be analogous, only with this difference—that when plants are diseased from what I call a want of energy, they generally assume a pale form, whereas many of the crippled varieties of insects are darker than the normal type.

In cases where the insects have bright red—as in the tigers and burnets—the red has a tendency to become yellow; and Mr. Bond pointed out to me that the yellows (as in *Plantaginis*, &c.) have a tendency to become red. But this is by no means universal, and in the few cases we know of, might it not be that the insects were originally red, and the cases of red variation we see now are cases of reversion to the original stock? I think there are more cases of reversion than we are at present led to suppose. *Halio wawaria* is a tolerably constant insect, but now and then we see one of a uniform dark slaty brown. *Cabera pusaria*, another constant species, occasionally comes out a dark leaden colour, and if these be simply “sports,” it seems strange that they should be all exactly the same. *A. cardamines* I have seen with the ground of all the wings yellow, which seems like a reversion to some of the yellow species of *Anthocharis* found on the Continent. A specimen of *C. caja* in Mr. Sydney Webb’s collection, in the appearance of the under wings seems to

approach *C. Hebe*, and an *Adonis* in Mr. Weston's cabinet is shot with copper on the under side of the same colour as that on the upper side of *P. phloëas*. *Argynnis Euphrosyne* seems to have a tendency to become black at the base of the wings, and in this respect approaching to *A. Frieja*, Thunb., and many other cases could be cited where one insect seems to approach the form of another, and generally one that bears some close relationship to it.

There is another variation to which some insects seem particularly liable, to which I have not yet called attention, and that is the bleached appearance frequently seen in *Satyrus Janira*, often in the form of round spots, and often corresponding on the two sides. I have seen what appears to have been brought about by a similar cause in *S. Tithonus*, *F. piniaria*, *S. Egeria*, and I think also in *Erebia Blandina*. I also know of three specimens of *Chelonia caja*, (Sydney Webb, C. S. Gregson, and F. Bond) in which the brown on the upper wings is nearly bleached away, the red on the lower wings changed to a pink, and the usual black spots a pale drab. One underwing of a male *S. carpini* in the late Mr. Owen's collection is the same, and such thing occurs also in the burnets. In the case of *Janira*, Mr. Gregson suggested that it might be caused by an old bottle or a dew-drop focussing the rays of light upon the pupæ, which in this species are exposed; and this idea seems strengthened when he told me that such *Caja* as the ones referred to above could be produced by the pupæ being long exposed to the sun. In the case of greenhouse plants, too, we frequently find that camellias, &c., are often scorched and discoloured by a speck in the glass focussing the rays strongly on one particular leaf, and the gardener has to put a dab of paint over the speck to stop the rays. After emergence, too strong light destroys *some* colours in lepidoptera, and for some time I thought that this was the true explanation of the bleached appearance in *Janira*. But if the spots were caused by focussing of the light, it would only touch on one part of the pupa, and could not be thrown on two sides corresponding exactly as they frequently do. It seems to me, in this case, that the bleaching more probably is caused by fluid touching the two wings when they are hanging to dry. In the case of *F. piniaria* the bleaching is confined to one side, and in all cases except *Janira* to the margin of the wings.

It is noteworthy that in lepidoptera we never find an albino. In the vertebrate animals, and especially in the birds, albinos are of frequent occurrence; in fact birds do vary generally in colour, seldom in position of marking. But in all the hundreds of varieties of

lepidoptera which have come under my notice, I have not seen one albino, using that term in the same sense in which we use it in the vertebrate animals. The nearest approach is a white *Grossulariata* in Mr. Gregson's collection, and that is only white because of the absence of the usual black spots, the white is extended and the black diminished, and the white is not substituted for some other colour as is the case in true albinos.

It has been suggested that carbon in the form of smoke, &c., does its share in the production of melanic varieties by being taken in along with the food plant of the larvæ, and this is not improbable in some cases, as some of the dark varieties like the black *Betularia* in manufacturing districts, and the dark *Biundularia* in Delamere Forest, are near to large smoky towns, and others like the dark forms we get from Scotland are near or on the peat bogs where carbon exists in another form. Still, I think, all dark varieties cannot be referred to this cause, as, for instance, the dark *Paphia* in the New Forest. Some insects are subject to suffusion, as in *Edusa* and *Hyale*, where the black border is sometimes suffused as far as the central spot, and Mr. Edwards, the American entomologist, thinks that this is often caused by long subjection of the pupæ to severe cold; and from my experience of the past year there seems to be something in this. Last winter, as most of us well know, was very severe—not only cold, but cold continued for a very long time, and the season (which should have been summer) which followed was remarkable for the quantity of varieties it produced.

But as yet we cannot tell what is the "exciting cause" in the production of some of those extraordinary freaks which we sometimes see, like a *Caja* in Mr. Webb's collection, one side of which is quite ordinary and the other side almost uniform dark brown. But, as I said at the commencement, we want each one to record the results of his observations in this line.

Primrose Hill, Huddersfield.

THE HYMENOPTERA OF LANCASHIRE & CHESHIRE.

BY BENJN. COOKE.

THE following list is offered as a contribution to the Hymenoptera of Cheshire and that portion of the county of Lancashire lying to the south of Lancaster—the portion of the county lying to the north of Lancaster belonging properly to the Lake district.

Where the name of any town is given in the list, it is to be understood that it refers to the district more immediately surrounding that town as a principal centre, near to which the species occurs.

TENTHREDINIDÆ.

- Tenthredo livida*, Manchester, Bowdon.
T. solitaria, Hazelgrove.
T. velox, Bowdon; Marple.
T. atra, Hazelgrove.
T. mesomela, do.
Pachyprotasis rapæ. Manchester, &c.
Perineura nassata, Manchester; Knutsford.
P. brevispina, Common.
P. auriculata, Manchester; Bowdon.
P. lateralis, Rivington.
P. aucupariæ, Manchester; Bowdon.
P. scalaris, Rivington.
Macrophya albicincta, Bowdon.
Allantus scrophulariæ, do.
A. tricinctus, do.
A. arcuatus, Common.
Athalia spinarum, Manchester.
A. rosæ, Common.
Dolerus pratensis, Hazelgrove; Bowdon.
D. madidus, Rivington; Staleybridge.
D. gonager, Manchester; Bowdon.
D. cenchris, Southport; Ormskirk; Bowdon.
D. coracinus, Manchester.
D. varispinus, Manchester; Bowdon.
D. arcticus, (?) Bowdon.
Strangylogaster cingulatus, Bowdon.
S. delicatulus, Marple.
Pæcilosoma obtusa, Manchester; Bowdon.
Taxonus glabratus, Manchester; Bowdon; Delamere.
Emphytus succinctus, Manchester.
E. cinctus, Hazelgrove.
E. serotinus, Rivington.
Phyllotoma nemorata, Rivington; (rare).
Cœnoneura Dahlbomi, Manchester.
Selandria serva, (common).
Eriocampa ovatos, Bowdon; Knutsford.
E. annulipes, Manchester; Rivington; Hazelgrove.

- E. atratula*, Bowdon.
Blennocampa luteiventris, Bowdon.
Hoplocampa ferruginea, Manchester.
Dineura Degeeri, Bowdon.
D. stilata, Manchester; Bowden.
Cladius difformis, (common).
Nematus rumicis, capreæ, (common).
N. brachyacanthus, Bowdon.
N. luteus, Hazlegrove.
N. ribesii, (abundant).
N. croceus, Bowdon.
N. palliatus, Rivington.
Cryptocampus angustus, Bowdon.
Cimbex femorata, Delamere Forest.
Trichiosoma lucorum, (common).
Abia sericea, Bowdon.
Hylotoma cærulescens, Southport, June, 1879; several on *Populus alba*.
Lophyrus pini, Warrington; (rare).
L. pallidus, do. do.

XIPHYDRIIDÆ.

- Cephus pygmæus*, Bowdon.

URO CERIDÆ.

- Sirex gigas*, Manchester.
S. melanocerus (juvencus of lists), Bowdon.

CYNIPIDÆ.

- Cynips quercus-folii*, Manchester.
C. lignicola, Manchester; Bowdon.
Neuroterus Malpighii, Manchester; Bowden.
N. fumipennis, Manchester.
Teras quercus-terminalis, Manchester; Marple.
Rhodites rosæ, Manchester; Marple.
Aulax Brandtii, Marple.
Allotria victrix, Rivington.

ICHNEUMONIDÆ.

- Ichneumon clericus*, Bowdon; Hazelgrove.
I. quadrimaculatus, do. do.
I. luctatorius, (common).
Trogus lutorius, Warrington; Cheshire coast.
Dicælotus pumilus, Rivington.
D. pusillator, Manchester; Bowden.

- Phæogenes planifrons*, Rivington ; Delamere.
P. impiger, Manchester ; do. Southport.
Microleptes splendidulus, Bowden.
Alomya ovator, Manchester ; Hazelgrove ; Marple.
Stilpnus gagates, do.
S. dryadum, do.
S. blandus, Rivington.
Phygadenon jucundus, Hazelgrove.
P. abominator, Marple.
P. fumator, Rivington ; Bowdon ; Hazelgrove.
P. pullator, do.
P. variabilis, Manchester ; Rivington.
Cryptus pygoleucus, Manchester.
Hemiteles tenebricosus, do. Rivington ; Bowdon.
H. melanarius, do. do.
H. tristator, do. Bowdon.
H. dubius, Rivington.
H. crassicornis, Manchester.
H. infirmus, Rivington.
H. micator, Manchester ; Bowdon.
H. inimicus, do.
H. castaneus, do.
H. palpator, Hazelgrove.
H. cingulator, Rivington ; Bowdon ; Delamere.
H. bicolorinus, Hazelgrove.
H. areator, Bowdon.
Orthopelma luteolator, Manchester.
Agrothereutes Hopei, Bowdon ; Delamere.
Aptesis nigrocincta, Rivington ; Cheshire coast.
Hemimachus rufocinctus, Southport ; do.
H. fasciatus, Manchester ; Bowdon.
Pezomachus tener, do.
P. festinans, Cheshire coast.
P. detritus, Southport ; Lytham ; Delamere.
Ophion luteum, Manchester ; Warrington.
Limneria dorsalis, Bowdon.
Canidia pusilla, Manchester ; Hazelgrove.
Atractodes bicolor (Hal.), Rivington.
A. bicolor (Grav.), Bowdon.
A. vestalis, Manchester.
Mesochorus strenuus, do.

- Exetastes tarsator*, (abundant).
Mesoleptus typhæ, Bowden; Hazelgrove; Marple.
Notopygus subrufus, Manchester.
Perilissus praerogator, Bowden; Hazelgrove; Marple.
Helictes mediator, Rivington.
H. flavopictus, Bowdon.
Tryphon rutilator, Manchester; Hazelgrove.
Exochus mansuetor, do. Delamere.
E. squalidus, Rivington.
Orthocentrus stigmaticus, Manchester.
Bassus lactatorius, do.
B. albosignatus, do. Rivington.
B. cinctus, Cheshire coast.
B. pectoratorius, Rivington.
B. exsultans, Manchester; Rivington.
B. deplanatus, do. (rare).
B. strigator, Southport; Hazelgrove.
B. areolatus, Rivington; Bowden; Hazelgrove.
B. dorsalis, Manchester.
B. maculatus, do.
B. festivus, Bowdon; Marple.
B. obscuripes, Manchester.
B. Desvignesi, do.
Metopius dentatus, Warrington; Cheshire coast.
Perithous divinator, Manchester.
Pimpla instigator, do. Warrington; Southport.
P. oculatoria, Delamere.
P. turioneila, Manchester; Bowdon.
Lissonota polyxonia, Rivington.
L. bellator, Manchester.
Clepticus paganus, Rivington.

BRACONIDÆ.

- Microgaster glomeratus*, Manchester; Rivington.
M. rufipes, Manchester.
M. meridianus, do.
Macrocentrus collaris, Manchester.
Alysia manducator, do.

BETHYLIDÆ.

- Cephalonomia formiciformis*, Bowdon.
Bethylus cenopterus, Southport.
Perisemus triareolatus, do.

EMBOLIMIDÆ.

- Embolimus* Ruddi, Bowdon.
Myrmecomorphus rufescens, Bowdon.

CHALCIDIDÆ.

- Eurytoma* abrotani, Cheshire coast.
Decatoma biguttata, do.
Calimome devoniensis, Manchester; Bowdon.
C. nigricornis, Manchester.
C. purpurascens, do.
C. inconstans, do.
C. dauci, Rivington.
Spalangia nigra, Manchester.
Cerocephala formiciformis, Bowdon.
Pachylarthrus flavicornis, do.
Pachyneuron formosum, Manchester.
Pteromalus puparum, do.
P. tibialis, Manchester.
P. robustus, do.
P. micans, do.
P. laticornis, do.
Choreius ineptus, Southport.
Elasmus flabellatus, Delamere.
Cirrospilus chabrias, Manchester.

CHRYSIDIDÆ.

- Cleptes* semiaurata, Bowdon.
Chrysis ignita, Common.
C. viridula (bidentata), Bowdon.
Hedychrum auratum, Manchester; Bowdon.

FORMICIDÆ.

- Formica* cunicularia, Greenfield.
F. fusca, Common.
F. fuliginosa, Bowdon; Delamere.
F. nigra, Common.
F. umbrata. Bowdon, 10th Oct., 1868.
F. flava, Abundant.
Ponera contracta, Manchester.
Myrmica ruginodis, Abundant.
M. scabrinodis, do.
M. lævinodis, Bowdon.
M. lobicornis, do.
M. domestica, Manchester.

(To be continued.)

OCCURRENCE OF THE FULMAR PETREL IN YORKSHIRE.

BY J. H. GURNEY, JUN., F.Z.S.

MR. CLARKE may be glad of a memorandum of a Fulmar Petrel, received in October 1868, from Flamborough Head. It was caught with a boathook by a fisherman, who has since been drowned—a circumstance which invests it with a melancholy interest.

When held up by one leg by the friend from whom I received it, it discharged above a wineglass-full of oil—not from the mouth, as I should have expected, but from its nostrils. I gave this bird to Mr. Gould, and he honored it by figuring it in his work on British Birds.

It has only once happened to me to see the Fulmar petrel alive, and that was in the English Channel; but I once—in June, 1869—picked up a dead one on the shore. It was exactly opposite Saltburn. I had been taking a stroll, when my attention was caught by some of its feathers borne towards me by the wind. A hundred yards on lay the petrel. It was so covered with sand, it had been so remorselessly tossed about by the breakers, and its plumage was so soaked, that I despaired of ever being able to skin it: but after careful drying it turned out a much better specimen than could have been expected. This bird was blind of one eye; perhaps it was because it could not see what it was eating that I found in its gizzard a small portion of a newspaper. It must have been a remarkably literary bird to take that on purpose.

Besides these, I have had eleven Fulmar petrels, principally Yorkshire specimens, and I must say that not in any bird have I seen greater variation in size of beak and in weight. The biggest pulled the scale down at 26oz., while the smallest weighed only 14oz. This is a discrepancy more than sufficient for a species-monger to coin a new species out of; but of course much depends on the condition the birds are in. The majority obtained in England are diseased, the healthy ones keep out to sea, and the weak are blown in by gales which they have not strength left to contend against. If the snow-white head and neck be the sign of the adult plumage, as is generally supposed, my oldest example had the smallest beak.

I hope that Mr. Clarke will make a thorough work of his “Birds of Yorkshire.” When so many counties have had excellent ornithologies written of them, and Norfolk in particular has had a work to be proud of, though not yet completed, it does seem very remarkable that no one should have come forward to do the same for the largest county in England; and I hope Mr. Clarke will receive all the assistance he deserves in his efforts.

Northrepps, Norwich, Nov. 4th, 1879.

Rainfall for October.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1'56	13	24'81	* 27'06	3—19	0'31
LEEDS ... (H. Crowther) ...	183	0'70	16	...	...	14	0'18
HALIFAX... (F. G. S. Rawson)	360	2'42	13	36'47	39'08	..	...
BARNLEY ... (T. Lister) ...	350	0'93	15	25'06	22'27	14	0'26
INGBIRCHWORTH (do.)	853	2'07	19	32'54	34'72	3	2'07
WENTWORTH CASTLE (do.)...	520	1'28	11	28'21	23'60	14	0'26
GOOLE ...	25	0'76	10	21'24	19'85	24	0'20

* This is the average to date for 13 years, 1866-78.

Short Notes and Queries.

ADDITIONS TO LIST OF SCARCROFT BIRDS.—Garden warbler (*Curruca hortensis*) breeds and is well distributed over the township. The tree sparrow (*Passer montanus*) also breeds freely in the district. It is often confounded with the house sparrow, from which it may be distinguished by the chestnut-coloured crown of head. In my previous list I remarked that the grey wagtail follows the plough; that is a clerical error. The remark about the grey wagtail ought to be tacked on the preceding bird. I should have corrected the error before Mr. Varley pointed it out, but in the pressure of business it was overlooked.—W. H. HAY, Elmwood Place, Leeds, Nov. 17th.

GREENLAND FALCON ON THE NORTH-WEST OF IRELAND.—A friend of mine gave me the other day a magnificent specimen of a light-coloured Greenland falcon (*Falco candicans*), shot at Eagle Island, north-west coast of Donegal by Mr. Williams; and also two white specimens of the common rat from the same island.—ALFRED BEAUMONT, Parkton Grove, Honley, Nov. 18th.

MANX SHEARWATER, &C., AT HUDDERSFIELD.—On Oct. 18th last some boys caught a Manx shearwater (*Puffinus anglorum*), in an exhausted state, at Long-lane, Dalton, Huddersfield. The same day my son called my attention to a flock of gulls passing over; and whilst we were watching them, a flock of I should say fifty wagtails passed over.—JAMES VARLEY, Almondbury Bank, Huddersfield, Nov. 18th.

RICHARDSON'S SKUA AT WAKEFIELD AND NORLAND MOOR.—On the morning of the 18th Oct., Mr. Wm. Talbot, of Wakefield, brought in a fine specimen of Richardson's skua (*Lestris Richardsonii*), which had been shot on the 15th inst. at Wakefield. The following week I went to see my friend Mr. John Gibson at Sowerby Bridge, who showed me a specimen of the same bird which had been shot on Norland Moor also on the 15th inst.—JAMES VARLEY.

GREAT-CRESTED GREBE AND KITTIWAKE AT WAKEFIELD.—Mr. William Talbot showed me a great-crested grebe (*Podiceps cristatus*), in immature female dress : also a kittiwake (*Larus tridactylus*), both killed at Wakefield this autumn.—JAMES VARLEY.

LITTLE GREBE AND WATER RAIL NEAR HUDDERSFIELD.—My friend Mr. Morley, of Skelmanthorpe, has brought me two birds for identification. One of them is the little grebe (*Podiceps minor*), the other the water-rail (*Rallus aquaticus*). The former was killed by flying against the telegraph wires, the water-rail by flying against a long chimney.—JAMES VARLEY.

COMMON BUNTING (*Emberiza miliaria*).—I received for preservation a very pretty fawn-coloured variety of this bird, shot in the north of Scotland last week.—G. PARKIN, Brampton, Cumberland, Nov. 15th.

LATE MIGRANTS.—Three swallows were daily on the wing in the Ryburn valley, during the last week in October. I saw one on November 1st, but none after.—F. G. S. RAWSON.

CORRECTION.—DUSKY PETREL.—The bird I announced as the dusky petrel turns out, according to the decision of Mr. J. E. Harting and Mr. Sharpe (head of the ornithological department of the British Museum), to be the Manx shearwater, although it differs very considerably from the description given in Yarrell. Prof. Newton informs me the description of the petrel given in many books is very imperfect : hence the difficulty of determining the species to which a specimen belongs. He knows of another case in which the Manx shearwater was announced as the dusky petrel.—J. SPURLING, Wakefield, Nov. 18th.

REVIEW.—“The Young Naturalist.” London : Bower Bros., 146, Walworth-road, S.E. Edited by S. L. Mosley and J. E. Robson.—Nos. I, II, and III.—This new venture, as its name implies, and as the opening address tells us, “is to cultivate a taste for Natural History among the young.” We trust, and moreover have every confidence, that it will succeed in so good an object. Both editors are well known as good naturalists. The articles thus far are well chosen, for though in the first two numbers we were inclined to think entomology received rather too large a share of attention in a general magazine, it is altered in No. III. It appears weekly (every Saturday) in eight-page numbers, published at 1d., and is consequently within reach of the pocket of every schoolboy. Besides being printed in clear type, it is profusely illustrated ; and although we notice several slight errors, chiefly printers', there are not

more than we should expect in a first attempt, and no doubt they will rapidly disappear as further experience is gained. Altogether we congratulate the editors on the result, and wish them every success.

Obituary—NOAH GREENING.—We regret to have to record the death, from ulceration of the lungs, of this well-known lepidopterist, which event took place on November 13th, at Douglas, in the Isle of Man. Mr. Greening was highly esteemed by entomologists all over the country, but was perhaps best known by those of Lancashire and Yorkshire. His collection of British lepidoptera was one of the largest and best ever formed ; but at present its destination seems uncertain.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—An interesting lecture was delivered by Dr. W. J. Lancaster, entitled “Notes on a Ramble in North Wales,” on Oct. 28th, illustrated by specimens of minerals and plants, aided by stereoscopic views. The third lecture was given by Mr Geo. Milner Nov. 11th, on “Mineralogy,” illustrated by minerals and coloured plates. The botanical section reported 250 plants observed in this district during the present unfavourable season. The ornithological division reported a few occurrences. Few song-birds were heard. Larks, which had almost disappeared since midsummer, heard by Mr. Lister in song Sept. 29th. The chaff-chaff sang at Denby Oct. 21st ; starlings sang in chorus October 25th, yellow-hammer 27th ; on same day 26 pochards, 2 terns, and 130 lapwings were noted in Walton Park. Richardson's skua was obtained near Wakefield on the 17th. Many wild geese, ducks, &c., passed over or settled on the pools near Barnsley ; also golden plover, in company with the green plover, in numbers.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting October 28th, under the presidency of Mr. Jagger.—Mr. Hebblethwaite, chairman of the Bradford Floricultural and Horticultural Society, gave a lecture on “Window Gardening, and the Cultivation of Bulbous Plants.” His remarks were based on the results of long experience in the cultivation of plants best adapted for windows, and of bulbous plants for outdoors. Amongst the former he included the *Dracena*, Egyptian lily, *Dielytra spectabilis*, *Ficus*, *Azalea*, *Spirea*, *Fuschia*, and *Geranium*, &c. ; and amongst the latter, the narcissus, squill, snowdrop, crocus, &c. He gave all the information necessary for their successful cultivation, and showed how, by strict care and attention, the choicest flowers may be grown in the centre of the town, notwithstanding the presence of gas and smoke. Mr. Hebblethwaite, in the course of his remarks, complained that architects, in preparing plans for the erection of houses—and especially was this the case in Bradford—neglected to provide that space which was necessary for the cultivation of plants. He thought this was to be regretted, for the

presence of blooming plants in the homes of the working classes had a very pleasing and cheerful effect, besides adding to the health and comfort of the inmates. The lecture contained many useful and practical hints, and was warmly received by a large and enthusiastic audience.—A number of local insects were at the same meeting shown by Messrs. Illingworth, Saville, and Carter.

HUDDERSFIELD SCIENTIFIC CLUB, Mr. S. L. Mosley, vice-president, in the chair.—Mr. G. T. Porritt exhibited a very beautiful almost black variety of *Polia flavocincta*, taken at sugar on the night of Sept. 17th ; also a hermaphrodite specimen of *Acronycta menyanthidis*, taken on Baildon Moor, near Shipley, by Mr. J. W. Carter of Bradford ; Mr. S. D. Bairstow showed a rat with a tanned hide, found, along with a cat in a similar condition, in an old building at Stratford-on-Avon, and which must have lain there many hundreds of years ; also various ichneumons showing different styles of setting. The specimens included *Pimpla detrita*, an undescribed *Ulophos* bred from *Coleophora vibricella* by Mr. Porritt, *Lisonota impressa* (?) from *Smerinthus ocellatus*, *Microgaster dilutas* from *Liparis auriflua*, and *Cryptus viduatorius* ; also a pale variety of *Abraxas grossulariata* from Rock Ferry.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—358th meeting, Oct. 28th, Mr. Benj. Holgate, F.G.S., vice-president, in the chair.—The chairman exhibited fossils from the Raygill quarries, Lothersdale, near Skipton. By means of diagrams he showed the position of this remarkable deposit of remains of various extinct mammalia. Mr. Walter Raine showed a long-eared bat (*Plecotus auritus*) from Ryther. Mr. W. Howgate, the stormy petrel (*Thalassidroma pelagica*) ; also the skeleton of that bird, and for comparison, foot of albatross. Mr. Chas. Smethurst, *Metrocampa margaritata* from Moseley Wood, Horsforth ; *Epione apiciaria*, bred from Bishop's Wood larvæ ; *Nonagria fulva* from Bishop's Wood ; and some interesting varieties of *Chelonia caja* and other lepidoptera. The microscopical exhibits included circulation in branchial tufts of young newt, leaves of *Scapania*, spores of *Pellia*, sections of frond of *Marchantia*, of receptacle of same, and plants of *Riccia natans* and *Selaginella stolonifera* (stained), shown by Mr. W. Barwell Turner, F.C.S. ; and lichens from Howden, spores of *Achlya* on fly's wing, *Vorticellæ*, diatoms, *Flosculariæ*, &c., from the canal at Leeds, by Mr. S. Emsley, in whose hands a fluid containing creosote and alcohol seems to have been used successfully, many delicate objects having been mounted in it by him.

359TH MEETING, Nov. 4th, Mr. C. Smethurst, president of the Entomological Section, in the chair.—The election of officers for 1880 for the Entomological Section resulted as follows :—Mr. Henry Lupton, president ; Rev. M. S. Dunbar, M.A., vice-president ; and Mr. Alfred Denny, secretary. Numerous local insects were shown, as *Sirex gigas* from Masham and Leeds, *Cynthia cardui* from Masham, &c. Mr. Henry

Ibbotson of York, who was present as a visitor, showed a large variety of rare and local plants. Numerous microscopical exhibits were made by Messrs. Washington Teasdale, W. Barwell Turner, F.C.S., and F. Emsley.

360TH MEETING, Nov. 11th, Mr. W. Barwell Turner, F.C.S., president of the Microscopical Section, who occupied the chair, was unanimously re-elected for the year 1880. The Botanical Section also re-elected their president, Mr. James Abbott, and for secretaries, Messrs. J. R. Murdoch and Percy Alexander. The exhibits were very numerous, and included two very ingenious "live-boxes," by Mr. J. W. Dixon; Møller's "Typenplatte," *Gyrosigma angulatum*, *G. formosum*, *G. hippocampus*, and *G. Balticum*, by Mr. Edward Thompson; and insects by Mr. F. Emsley. Mr. Abbott showed *Sphæroplea annulina*, a morphological slide of *Volvox globator*, *Riccia glauca* in fructification, and a series of beautiful stained preparations of the cockroach (*Blatta orientalis*). From these is shown that the hairs on the antennæ pass through holes in the chitinous coats of those organs, and proceed directly from the nerve-tissue beneath, thus showing that the antennæ are tactile organs. Messrs. W. Barwell Turner, F.C.S., and W. E. Clarke, who are working at bird-parasites together, showed *Docophorus variabilis*, parasitic on the dunlin, *Nirmus fuscus* from the hen harrier, and also a *Docophorus* from the gray plover (*Squatarola helvetica*), which is not described in Denny's "Monographia Anoplurorum Britannica" as infesting that bird. Mr. Turner further showed the diatoms *Actinocyclus Ralfsii*, *Gephyrea incurvata*, and *Craspedodiscus pyxidicula*. Mr. James Fogg exhibited fresh-killed specimens of the gannet and great black-backed gull (immature), killed on the Yorkshire coast.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, Mr. J. Whitehead, president, in the chair.—The following interesting and locally rare mosses were exhibited by the president:—*Eurhynchium pumilum* from Stirrup Wood, Derbyshire; *Gymnostomum squarrosus* from Hattersley, Cheshire; and fine fruiting specimens of *Climacium dendroides* from near Stirrup Wood; also the two locally rare hepaticæ, *Ptilidium ciliare* and *Mastigobryum trilobatum*, from Charlesworth Coombs, Derbyshire. Mr. Holt exhibited *Barbula marginata* from Ashley Mill; *Pogonatum nanum* from Halebarns; and *Dicranella Schreberi* from near Rochdale—all of them rare in the Manchester district. Mr. W. H. Pearson, vice-president, mentioned that he had received from Mr. B. M. Watkins, of Ross, specimens of a *Riccia* which he had determined as *Riccia tumida* (Lindenberg); it was collected within the past few months about ten miles from the other recorded Herefordshire station, where it was previously collected with *Riccia sorocarpa* (Bis.) also by Mr. Watkins. The other stations are Cardiganshire (Wm. Joshua), Barmouth (T. Rogers and W. H. Pearson). Mr. Pearson also read a short note, translated from the Swedish by his friend Herr Zöller, on *Andræa Rothii*, by Prof. Lindberg, who pointed out that in Scandinavia three species had been

confounded under this name. In the first place there is the real *A. Rothii*, which grows at or near to the sea coast, and has its leaf formed of from two to three cell layers; second, *A. falcata*, which is peculiar to the mountainous passes, and which varies considerably, especially as regards the leaf margin; the third is *A. obtusifolia*, previously recorded from Greenland: it has been found by the Professor in Pitea, Lapland. The honorary secretary intimated that the Society's soiree had been fixed for the 20th Dec., and also read a communication from the secretary of the Royal Microscopical Society, pointing out that the council had recently passed a new rule admitting the president as an *ex-officio* Fellow of their Society, and also granting the privilege of receiving a copy of their Journal for the Society's use.

MIRFIELD NATURALISTS' SOCIETY.—Monthly meeting, 1st November, Mr. W. H. Wormald in the chair.—Mr. Jas. Varley of Almondbury read a very interesting and able paper on the "Migration of Birds," after which there was a short discussion on the subject.—T. CARDWELL.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, Nov. 5th, Mr. Sims in the chair.—Mr. Wilson exhibited *D. Templi*; Mr. Sims, *C. miniata*, *E. sobrinata*, *M. procellata*, *C. Haworthii*, and *P. V-aureum*.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Nov. 12th, Mr. M. Smith, vice-president, in the chair.—The chairman exhibited a box of coleoptera, amongst them being *Callidium violaceum* and *Timarcha laevigata*. Mr. G. Bacon: eggs of the buzzard tribe, five varieties of *Falco buteo*, the common buzzard *F. lagopus*, the rough-legged ditto, and *F. apivorus*, the honey buzzard. Mr. G. Benson, jun.: a specimen of *Hippocampus*, also a specimen of the flying fish, *Exocoetus volitans*. Mr. G. C. Dennis: a box of lepidoptera, taken by himself during a short stay at Boston Spa; also a fine series of *Grossulariata*: amongst them were some very fine varieties. Mr. Wilson: a box of lepidoptera taken by himself in this district: amongst them were *Agrotis aquilina*, *Hadena suasa*, dark variety, *Spilodes sticticalis*, *Rhodophaea consociella*, *Phtheochroa rugosana*, *Cerostoma seabrella*, *Depressaria costosa*, and *Angelicella*. The hon. secretary (Mr. Prest): the living larva of *Aplecta herbida*, reared from the egg; the living larva of *Noctua rhomboidea*, sent to him by Miss Golding Bird, and taken by that lady in the New Forest; also a fine series of *Cnephasia cinctana* and *Pterophorus spilodactylus*, the latter species bred. The hon. secretary made the following offer to the members, viz:—That during the months of November, December, January, and February he would be at home every first and third Monday to those members and friends who would like to inspect his collection, compare specimens, and to impart information upon the various localities he had visited during the season, and any other matters that may be useful to the members. The meeting at once accepted Mr. Prest's kind offer, and passed a vote of thanks to him unanimously.

Diary.—Meetings of Societies.

- Dec. 2. Liversedge Naturalists'. Bishop Auckland Naturalists'. Leeds Naturalists', &c.
 " 3. Wakefield Naturalists'.
 " 4. Bradford Scientific Association: Paper by Mr. E. Mirfield.
 " 5. Goole Scientific Society: Paper, "History and Development of *Volvox globator*"—Mr. James Abbot, of Leeds.
 " 8. Manchester Cryptogamic.
 " 9. Leeds Naturalists', &c.—Annual Meeting.
 " 9. Bradford Naturalists', &c.—Annual Meeting and Soirée.
 " 10. York and District Field Naturalists'.
 " 11. Barnsley Naturalists', &c.: Paper, "Extinct recent British Animals"—Mr. C. Bellamy.
 " 11. Bradford Scientific.
 " 18. Do. do. —Paper, "The study of Cryptogamic Botany"
 Mr. W. West.
 " 18. Dewsbury Naturalists'.
 " 19. Goole Scientific.
 " 20. Huddersfield Scientific Club.—Annual Meeting,
 " 23. Barnsley Naturalists'.
 " 29. Lancashire and Cheshire Entomological.

CATALOGUE OF THE BIRDS OF YORKSHIRE.

Information is earnestly requested relating to that portion of the Order *Passeres* contained in the following genera: *Laniidæ*, *Muscicapidæ*, *Oriolidæ*, *Cinclidæ*, *Turdidæ*, *Sylviidæ*, *Troglodytidæ*, *Certhiidæ*, *Sittidæ*, *Paridæ*, *Psittidæ* and *Ampelidæ*, (Shrikes, Flycatchers, Oriole, Dipper, Thrushes, Warblers, Wren, Creeper, Nuthatch, Titmice, and Waxwing). It is hoped that contributions will be sent from all parts of the county, giving not merely a list, but if possible, and it is desired, remarks on the residents, migrants, rare and occasional visitants, &c., &c.; also the absence or rarity of any common species in certain districts, and the boundaries of the districts alluded to in all cases. The compiler is particularly anxious to work out the distribution of species. All assistance will be duly acknowledged by WM. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

N.B.—Similar remarks on the *Accipitres* acceptable, and will be in time for the revision of that order.

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HUDDERSFIELD :

B. BROWN, MARKET PLACE CORNER.

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Original Articles.

BRYOLOGICAL NOTES.—NEW BRITISH SPECIES.

BY REV. J. FERGUSSON.

SOME time ago I received from Mr. Whitehead, of Dukinfield, a *Bryum* found by him on loose earth among limestone rocks, near Litton, in June last. The quantity gathered was very small, as is almost invariably the case with a species picked up for the first time by a collector, or unknown as a native of the district or county in which he resides. Moreover the capsules, though perfectly formed, had not reached the very point of ripeness which is so desirable when careful dissections of the *Cladodium* group of *Bryum* have to be made. The aspect of the plant is peculiar; the seta in any case is not more than seven lines in length, is suddenly bent downward at the summit, and then curves inward, so that the capsule lies on its back looking upward. Any one who turns to the figure of the left-hand capsule of *Zieria demissa* as given in the "*Bryologia Britannica*," and supposes the loop formed by the seta and capsule to be constricted to half its size and the capsule raised proportionally, will have a very fair idea of the appearance of the seta and capsule of Mr. Whitehead's plant. Tufts of other *Brya*, such as *B. inclinatum*, occasionally present a capsule here and there turned in the same manner, but with them this is the rather rare exception. Here it is the rule without any exception. At first I supposed the plant to be a new species, and I still hold this supposition to be worthy of careful consideration, though I now lean more to the opinion that the plant may finally have to subside into a variety of *B. arcticum*. It seems to differ from *B. arcticum* in having the leaves twisted when dry, in their narrower border, in the rather bladderly capsule not at all constricted below the mouth, which is extremely small and not oblique, in the short seta, in the smaller, and, so far as I can judge, smooth spores. These are all, it must be confessed, fine distinctions—and distinctions which might not prove constant if more numerous specimens were subjected to examination. Until these are secured it may suffice to call special attention to the plant, a description of which is appended to these notes, under the name of *Bryum rufum*.

During the past year I have been favoured by Professor Barker with a fine collection of *Grimmiæ* gathered by him during various rambles through Scotland, England, and Ireland. In this collection there are some species of great rarity, and one with the first fruit which has been observed in this country. I was greatly delighted to

notice in it a plant which I at once recognised as *Coscinodon cribrosus*, the *C. pulvinatus* of Sprengel and of modern authors—an immensely interesting addition to our British list. For some years I had been expecting that this species (whose geographical position ranges from mid-Norway to South Italy, and from the Pyrenees to the Tyrol Mountains) should some day be discovered in Britain; but I had fancied that it would have been reported from our Scottish mountains rather than from the English Coniston, where Prof. Barker found it in April, 1867. In connexion with this announcement of its occurrence in Britain it may be allowable to make one or two statements about its early history.

It was first gathered by Persoon, near Goslar, in Hercynia, and named *Grimmia cribrosa* by Hedwig in his great work "*Descriptio et Adumbratio Muscorum Frondosorum*," published in the years 1787–97. In 1804 Sprengel removed it from the genus *Grimmia* to *Coscinodon*, a genus specially created for its reception, and essentially characterised by the remarkably cribose condition of the peristome. When placing it in this genus he substituted the new specific name of *pulvinatus* for the earlier name given by Hedwig—a proceeding not permissible in the circumstances—and thus *Grimmia cribrosa*, Hedw., became *Coscinodon pulvinatus*, Sprengel. The "*Bryologia Europæa*" and most modern authors have adopted the latter name in its entirety, but Spruce, C. Müller, and De Notaris, while recognising the necessity of the generic change, have rightly adhered to the original specific name given to the plant by Hedwig. A description of this interesting species is appended.

BRYUM RUFUM (PROBABLY A VARIETY OF *B. ARCTICUM*).

Tufts loose, dark brown. Stems slender, innovating, four or five lines long, with few radicles. Leaves enlarged towards the top of the stem, where they form a gemmiform tuft, all of them brownish, twisted when dry, patent, then incurved from about the middle; the lower ones ovate acute, with scarcely recurved margin and nerve ending in or just beyond the apex; the upper ones ovate lanceolate, carinato-concave, never red at the base, with quite entire recurved margins and a narrow border of two or three rows of cells. Nerve yellowish-brown when old excurrent into a perfectly smooth yellowish point. Inner perichaetial leaves minute, irregularly lanceolate with wide cells and sub-excurrent nerve. Cells mostly without chlorophyl, rather wide, hexagonal in the upper part of the leaf, rectangular at the base. Capsule pendulous, at length looking upwards owing to the curvature of the summit of

the seta, obovate or oblong pyriform, rather *bladdery*, *not constricted below the very small mouth, which is not oblique*, the neck as long as the capsule. Lid very small conical obtusely apiculate. Ring broad, of three to four rows of *pale yellow cells*. Peristome small, its outer teeth lanceolate-subulate pale yellow above, fuscous below, the inner adhering to the outer, and about the same length. Cilia not seen. Seta *four to seven lines long*, reddish brown. Inflorescence synoicus. Fruit, July.

Altitude ? Distribution, Prov. 8.

Habitat, &c.—Loose earth among limestone rocks, Litton; June, 1879, Mr. Whitehead.

COSCINODON CRIBROSUS (GRIMMIA), HEDW., SPRUCE, &c.;

C. pulvinatus, Sprengel. *Bryol. Europ.*; Milde, &c.

Tufts 1in. to 3in. broad, glaucous or dark grey, often black below, usually very earthy and cohering loosely, rounded or patchy. Stems about half an inch long, dichotomously branched. Leaves adpressed when dry, *erecto-patent when wet*, rather tender, lanceolate and channelled above, from an ovate or oblong concave base, *with a furrow on either side of the nerve*, rather obtuse, the upper ones with hair points, broad, flat decurrent at the base, shortly toothed, as long as or longer than the leaves. *Margin erect*. Nerve channelled semiterete, cells in the upper part of the leaf, small roundish, rather opaque, quadrate lower down, sub-contiguous, those at the base next the nerve rectangular contiguous, those next the margin more hyaline. Capsule *submersed, not reaching the top* of the hair points, *erect obovate, very wide-mouthed*, thin-walled, smooth, pale yellowish brown. Lid large, broadly conical, with an erect obtuse rostrum. Calyptra lobed at the base, plicate, covering almost the entire capsule. Peristome large, its teeth *widely lanceolate*, faintly barred, *beautifully cribose*, papillose at the apex, yellowish or reddish, reflexed when dry. Seta very short straight. Vaginula with a hyaline crown, oblong. Dioicous. Fruit, April.

β sub-perforata, “an species propria,” Philibert MSS. Tufts and stems as in the type. Leaves less patent, hair points short. Capsule a little turned to one side of the stem. Peristome more distinctly barred, much less perforated, purple. Not British.

Altitude ? British distribution, Prov. 12.

Habitat.—On rocks and in crevices, Coniston. Apr., 1867, Prof. Barker.

Foreign distrib., Scand., Germ., Aust., Switz., Italy, France, Spain.

NOTE ON THE ANTIQUITY OF SOME SPECIES OF *MUSCI*.

BY C. P. HOBKIRK, F.L.S.

PROF. Bayley Balfour, of Glasgow, recently sent to me for determination a small tuft of a moss, which possesses very considerable interest to the botanist, the archæologist, and the geologist alike, and on which, with some others presently to be mentioned, I propose to offer a few notes.

Dr. Munro, of Kilmarnock, has been exploring one of the old "crannogs," or lake dwellings at Lochlee, near Kilmarnock, and in the course of his investigations has found in it a number of tree trunks of various species, such as oak, elm, birch, &c., and some relics of its human occupation. A full account of his discoveries will be published by Dr. Munro in the Proceedings of the Society of Antiquaries of Scotland. Amongst the other relics found are a number of tufts of the moss just named. This is in a very brittle state, much pressed and matted together, broken and semi-carbonised, but still sufficiently well preserved for identification. On examination it proves to be *Hylocomium splendens*. Some fringes and a girdle made of the stems of *Polytrichum commune*, plaited, were also among the relics. Through the kindness of Dr. Munro I have received specimens of this moss and another for examination. The *Polytrichum* is well preserved, and is quite a characteristic specimen, not so much broken as the *Hylocomium*, but if anything blacker, and more carbonised. It shows, however, distinctly the white margin and teeth of the leaf, which are quite brown under the microscope, as is also the hyaline portion of the base; and the lamellæ of the centre of the leaf may be distinctly recognised. The third moss is almost denuded of leaves, and consequently it is difficult, if not impossible, to recognise it. So far as I have examined it under the microscope I can find only the leaf attachments and the torn bases attached to the stem, which is some five or six inches long, rather rigid, shows signs of having been more or less branched, and looks at first sight not unlike a number of stems of *Hypnum stramineum* or *aduncum*. Amongst these stems, in the form almost of "microscopic dust," is a quantity of debris of leaves, &c. On examining these I am disposed to think that many fragments of tips and bases of leaves have belonged to *Eurynchium prælongum*, but whether they belong to the stems is doubtful: I scarcely think so. Another longer and narrow fragment looks very like a leaf of a *Campylopus*, whilst several fragments show distinctly the peculiar cell structure of *Sphagnum*, the spiral thread being

distinctly visible. Another scrap shows plainly one leaf and part of another of *Lepidozia reptans*, whilst mixed up with the smaller dust are numerous diatoms, chiefly I think *Navicula*.

The chief interest of these specimens centres in the question of the antiquity of the Lochlee crannog, on which I am not in a position to decide; but knowing generally the horizon of these structures, we are safe in considering that they have been there buried a goodly number of centuries. They have evidently been so long buried as to have undergone the first stages, at any rate, of fossilization, and they are the most ancient specimens of mosses that have come under my cognisance. For many years I have been hankering after a fossil moss, but have as yet come no nearer than these. I have seen specimens so labelled from Burntisland which are not mosses at all—with which conclusion, by the way, Prof. Williamson, F.R.S., entirely agrees, and there can be no better authority on those beds,—and I have seen specimens from the “Halifax hard bed,” in the coal measures, but these are also more than doubtful. I have seen specimens from other localities as well, but to all such I must append the same verdict.

It would be interesting to be informed whether any undoubted specimens have been found in similar localities or in other formations, either in this or other countries; and if so, what they are. I have seen various lists drawn up by Prof. Heer of the cryptogamic plants from various localities, and from older deposits than the one above named, but in none of them have I seen any mention of mosses or their allies. Can any one supply information on this subject?

Huddersfield, 6th Dec., 1879.

THE HYMENOPTERA OF LANCASHIRE & CHESHIRE.

BY BENJN. COOKE.

(Concluded.)

MUTILLIDÆ.

Myrmosa melanocephala, Delamere.

POMPILIDÆ.

Pompilus gibbus, Common.

P. pectinipes, Southport, July, 1879.

P. plumbeus, Southport; Cheshire coast; Common.

P. niger, Manchester; Southport; Hazelgrove.

P. rufipes, Southport.

P. exaltatus, Bowdon; Delamere.

Ceropales maculata, Southport, Sept., 1865.

SPHEGIDÆ.

Ammophila sabulosa, Common.

A. viatica, Southport.

NYSSONIDÆ.

Nysson spinosus, Common.

Gorytes mystaceus, Manchester; Bowdon; Hazelgrove; Marple.

Mellinus arvensis, Common.

LARRIDÆ.

Astata stigma, Southport, 25th June, 1879; rare.

CRABRONIDÆ.

Trypoxylon figulus, Bowdon; Not common.

Crabro clavipes, Common.

C. dimidiatus, Cheshire coast.

C. luteipalpis, Hazelgrove; scarce.

C. leucostoma, Manchester; Hazelgrove.

C. podagricus, Hazelgrove.

C. obliquus, Manchester; Hazelgrove; Delamere Forest; Cheshire

C. vagabundus, Common. [coast.

C. quadrimaculatus, Bowdon; Delamere.

C. cephalotes, Bowdon.

C. cribrarius, Common.

C. patellatus, Manchester; Southport; Cheshire coast.

C. chrysostomus, Common.

C. Lindenius, Cheshire coast.

Oxybelus uniglumis, Southport; Cheshire coast; Bowdon.

O. mucronatus, Cheshire coast.

Diodontus minutus, Bowdon.

Pemphredon lugubris, Common.

Cemonus unicolor, do.

C. lethifer, do.

Psen pallipes, Manchester; Bowdon.

Mimesa bicolor, Delamere.

PHILANTHIDÆ.

Cerceris arenaria, Cheshire coast; I have not seen it for many years.

EUMENIDÆ.

Odynerus sinuatus, Manchester; Hazelgrove; not common.

O. ..., Common generally.

- O. parictum*, Common generally.
O. trifasciatus, do.
O. trimarginatus, Manchester; on the Scotch thistle; somewhat
O. pictus, Common. [local.]

VESPIDÆ.

- Vespa Norvegica*, Fir woods, Delamere Forest, &c.
V. vulgaris, Common everywhere.
V. Germanica, do.
V. rufa, Less common than the other species.

ANDRENIDÆ.

- Colletes succincta*, Delamere.
C. cunicularia, Cheshire coast; Southport.
C. fodiens, Southport.
Prosopis hyalinata, Cheshire coast.
Sphecodes gibbus, Common.
S. rufiventris, Southport; Hazelgrove.
S. ephippia, Bowdon.
Halictus rubicundus, Abundant.
H. tumulorum, Bowdon.
H. leucozonius, Common.
H. cylindricus, do.
H. villosulus, Hazelgrove.
H. lævigatus, do.
H. nitidiusculus, do.
H. minutus, Abundant.
H. atricornis, Hazelgrove.
H. morio, do.
Andrena cineraria, Common.
A. nitida.
A. albicans, Abundant.
A. fulva, Common.
A. Clarkella, Manchester; Bowdon; Delamere.
A. Gwynana, Bowdon.
A. bicolor, Hazelgrove.
A. helvola, do.
A. nigro-cænea, Bowdon; Hazelgrove.
A. Trimmerana, Abundant.
A. angustior, Hazelgrove.
A. fulvescens, Manchester.
A. albicus, Abundant.
A. labialis, Hazelgrove.

- A. nana*, Bowdon ; Hazelgrove.
A. xanthura, do. do.
Dasypoda hirtipes, Cheshire coast.

APIDÆ.

- Nomada ruficornis*, Common.
N. lateralis, Manchester.
N. ochrestoma, Hazelgrove.
N. borealis, Rivington.
N. Lathburiana, Manchester.
N. Fabriciana, Common.
N. alternata, do.
N. succincta, do.
Cælioxys simplex, Southport ; Cheshire coast.
Megachile centuncularis, Common.
M. versicolor. Bowdon.
M. circumcincta, Southport.
M. maritima, Cheshire coast.
Osmia rufa, do.
O. cænea. do.
Anthophora retusa, Hazelgrove.
Apathus vestalis, Southport.
Bombus muscorum, Common.
B. senilis, Warrington.
B. lapponicus might perhaps be included, but it is more properly a Yorkshire bee. I have captured it on the high moors near Marsden. A friend, whom I can trust, says it occurs on the hills near Stalybridge.
B. lapidarius, Common.
B. terrestris, do.
B. lucorum, Abundant.
B. hortorum, Common.
B. subterraneus.
Apis mellifica.
 Southport, Oct., 1879.

NOTES ON SOME VARIETIES OF BIRDS.

BY ALFRED BEAUMONT.

At the request of the editors, I have much pleasure in laying before the readers of the *Naturalist* a few stray notes and remarks on some of the varieties of birds, of which specimens are in my own collection.

I have for some years past made it a point to look out for variations—with what success will appear from the sequel; and though the list appended does not by any means comprise the whole of the varieties in my possession, yet it will give a fair idea of some of the principal variations from type which have fallen into my hands at one time or other. It will be remarked that I have not, in all cases, given the locality where the bird was shot, nor yet the date of its capture, for this reason: where there is any doubt about either of these points I think it to be the best course to pursue, to withhold even the supposed localities, rather than, by giving them, to mislead any one.

With these few prefatory remarks, I at once proceed to indicate a few of the varieties in my possession, and, as shortly as possible, to point out their chief divergences from the types.

FIELDFARE—*Turdus pilaris*.—This specimen was shot at Hornby Castle, near Bedale, by Mr. Savage, the gamekeeper, and was given to me by him. It is a beautiful specimen, and may be described as a peculiar light variety, with white wings and a light-coloured head.

REDWING—*Turdus iliacus*.—This again is an exceedingly light variety, and was received from Mr. Williams, of Dame-street, Dublin. There can be no question as to the identity of the species, as it possesses distinctly the characteristic mark behind the eye. The throat, breast, and tail are beautifully mottled with light tawny and white, the wing coverts being pale tawny.

RING OUZEL—*Turdus torquatus*.—Is generally of the ordinary type, except the neck, which is spangled with white.

FURZE OR WHIN-CHAT—*Sylvia rubetra*.—This is a white variety.

SNOW BUNTING—*Emberiza nivalis*.—This is a beautiful variety, having the throat and breast pure white, and an entirely black back.

CHAFFINCH—*Fringilla cælebs*.—Differs from the type in having the wings, back, and tail white.

GREENFINCH—*Coccothraustes chloris*.—An Irish specimen: is of a very pale yellow colour, with an olive tinge.

STARLING—*Sturnus vulgaris*.—This bird has the breast of the normal colours, the true spangle of the starling, whilst the head, back, and wings are buff-coloured.

ROOK—*Corvus frugilegus*.—The whole of the plumage of this specimen is of a light brown colour, with the upper part of the wings exceedingly pale.

MAGPIE—*Corvus pica*.—Specimen shot at Woolley Hall, near Barnsley. In place of the normal black colour it is of a dirty white.

RINGDOVE—*Columba palumbus*.—This is a very beautiful specimen, of a pure white all over.

RED GROUSE—*Tetrao scoticus* (*Lagopus*).—Two specimens, male and female, shot on the Duke of Devonshire's estate, above Halifax. The hen shot on the 12th August is of a pale buff colour; the cock (shot a few weeks later), of a light dun colour. Another specimen, shot on Slaithwaite moor, and presented to me by the late John Horsfall, Esq., has a light brown body, with dun or ashen-coloured wing coverts and tail.

PARTRIDGE—*Perdix cinerea*.—I have four varieties of this bird: one, a dark, small variety, the ordinary form of our locality on the moor edges; another, a light variety of unusually large size, from the North Riding; the third, an albino shot near Doncaster; the fourth is of the normal colouring, with white wings and partially white breast.

Parkton Grove, Honley,
Nov. 24th, 1879.

NOTES ON BIRDS OBSERVED IN DUTCH BRABANT.

BY WM. EAGLE CLARKE.

May 5th to 19th, 1879.

THE following observations were made during an oological trip in south-eastern Holland in the month of May last; and although not British, I venture to think they will be both interesting and useful to ornithologists, inasmuch as in every instance the species enumerated occupies a place in the British, and (with one or two exceptions) the Yorkshire, list.

I have thought it desirable to give the notes under the head of the various species, deeming this to be the best and most concise form. The list thus given should afford a fair idea of the ornithology of the district, there being four of us, and ornithology received our undivided attention during a fortnight's sojourn.

Leaving Leeds on the morning of Monday the 5th of May, and travelling *via* London, Queenborough, Flushing, Middlebourg, Breda, Boxtel, Eindhoven, we arrived at Valkenswaard—our destination—by continuous travelling, about noon on the following day.

Valkenswaard, our headquarters, is a village with about 1300

inhabitants, in the province of Dutch or North Brabant, and is situate about five miles and thirty miles, respectively, from the Belgian and German frontiers. With regard to the character of the country, Valkenswaard is surrounded by vast heaths or plains, resembling flat moors, that on the eastern side of the village being the largest, and extends some twelve miles in length by three miles broad. This is covered with heather for its greater part, and studded with numerous shallow lagoons, varying in size, and surrounded with long yellow grass. Running through the plain from south to north is the river Tongreep, which is exceedingly deep and sluggish, and whilst narrow in some places, in others it spreads out, forming extensive marshes, with tussocks of coarse grass, and a luxuriant growth of aquatic plants. Here and there in the marsh and lagoon are sedgy islands, on which the bog-myrtle, stunted willows, sallows, and alders flourish.

The other heaths are similar to the one described, that on the west being traversed by the rivers Dommel and Kierschop, which unite a little to the north of Valkenswaard. Thus three rivers run nearly parallel to each other at almost equal distances.

Pine and fir plantations and willow garths are numerous. A few stunted pine trees are scattered in clusters or singly on the heaths.

The above brief sketch will give a sufficiently good idea of the general face of the country for the purposes of the present article.

Where a species is simply enumerated, it is meant to imply that it is common, and nothing special was noted concerning it.

The name appearing in brackets after the specific name is the Dutch name for that species.

Peregrine Falcon.—This species will always be associated with the village of Valkenswaard, which is famous for having in the days of falconry supplied Europe with both falcons and falconers; but an indication of the present position of that noble sport may be found in the fact, that this once village of falconers now contains one family only, that of Mollen, which follows the calling. The Mollens, father and two sons, capture this species whilst on the autumn passage by an elaborate system of trapping, and after training, send most of them to England. Adrian Mollen, the father, filled the office of head falconer to the King of Holland for many years, and has retired on a pension. We frequently saw the peregrine on the heaths; these birds belonged to the spring migration, and were unusually late in taking their departure. On the 15th a fine flight was observed with a teal which, seeking the river with a splash, foiled its noble pursuer.

Hobby (*Boomwalk*).—These birds were observed on the 11th, this being no doubt the date of their arrival. We watched them long with our binoculars as they flew within twenty yards whilst hawking flies, &c., on the heath; and were much interested in seeing how dexterously they fed on the wing by bringing the foot containing the prey to the mouth.

(*To be continued.*)

Rainfall for November.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·71	12	26·32	* 30·10	11	0·47
LEEDS ... (H. Crowther) ...	183	1·22	14	...	...	20	0·50
HALIFAX... (F. G. S. Rawson)	360	1·87	14	38·34	42·73	...	...
BARNSELY ... (T. Lister) ...	350	1·38	14	26·44	24·57	20	0·39
INGBIRCHWORTH (do.)	853	2·29	18	34·83	37·44	20	0·35
WENTWORTH CASTLE (do.)...	520	1·58	13	29·79	25·71	20	0·35
GOOLE ...	25	1·24	14	22·48	22·49	20	0·38

* This is the average to date for 13 years, 1866-78.

TEMPERATURE AT HUDDERSFIELD.—The following extract from the Meteorological Observations for first week in December, 1879, taken at the Huddersfield Cemetery, 400 feet above the level of the sea, have been furnished at our request (*Eds. Nat.*):—

DATE.	Minimum Night Thermometer, Exposed.		Maximum Day Thermometer.	
	<i>a.</i>	<i>b.</i>	<i>c.</i>	<i>d.</i>
Monday, 1st December ...	22°	24°	30°	30°
Tuesday, 2nd „ ...	6	10	29	36
Wednesday, 3rd „ ...	10	12	26	30
Thursday, 4th „ ...	9	11	26	34
Friday, 5th „ ...	15	17	31	35
Saturday, 6th „ ...	17	19	26	34
Sunday, 7th „ ...	11	11	31	35

a. on the grass. *b.* 4ft. above the ground. *c.* in the shade. *d.* in the sun.

The above readings are from shaded thermometers placed on stands recommended by the Meteorological Society for use by meteorologists when taking readings for the use of that Society, and which give the true air temperature more accurately than thermometers exposed to rain and snow, which read lower in consequence of the loss of heat by radiation during the evaporation of moisture from the glasses.—J. FIRTH.

Short Notes and Queries.

"ON SOME CAUSES WHICH SEEM TO OPERATE IN THE PRODUCTION OF VARIETIES IN LEPIDOPTERA."—Mr. Mosley's ably written and interesting article on the above subject will be welcomed by experimental entomologists who have tried, but failed, to elucidate any *bona fide* results from their own personal observations in the matter of causes of variation. The species of lepidoptera which he classifies under the head "constant" we should naturally suppose would come in that category, as in order to form themselves into varieties they would have to reveal a tendency for changing entire colours or shades, rather than individual patterns—the markings, in contrast to most of the other families, being limited in quantity (vide *Sesidæ*, *Procridæ*, *Lithosidæ*, and *Zygænidæ*. In the latter (say *filipendulæ*, yellow var.) the tendency appeared to be more towards changing the entire colour. I imagine atmospheric conditions are an important item in either forcing or straining variable peculiarities. In the low and warmer spots of the North Welsh woods *Larentia olivata* appears much darker than in the more elevated and cold situations; likewise *Gnophos obscurata*—those I have captured on the bleak Orme's Head being much paler than those from the Conway vale. Mr. Mosley attributes this variation to natural selection or local race. The close proximity of the Conway vale to the Orme's Head would not point to a localisation of species. The dark *caja* which I bred some years ago (now in Mr. Porritt's collection) was reared in a kitchen, and at a high temperature. Is it not a fact that rearing *caja* with lettuce for the food-plant, instead of its ordinary fare, makes it considerably more prone to variation?—S. D. BAIRSTOW, Woodland Mount, Huddersfield.

Podiceps minor AT SHEFFIELD.—I received on the 6th instant a living specimen of the little grebe (*Podiceps minor*), taken on the Sheffield canal. I believe the occurrence of this bird is not frequent in the neighbourhood.—E. HOWARTH.

ARACHNIDÆ NEAR SELBY.—During September last I beat out specimens of the following spiders at Bishop's Wood :—*Epeira quadrata*, *E. scalaris*, *E. angulata*, and *E. diadema*. They may be worth recording.—CHAS. SMETHURST, Nov. 25th.

COLEOPTERA NEAR LEEDS.—I collected some fine specimens of *Coccinella 14-guttata*, also *C. oblongo-guttata*, at Horsforth on the 25th of August last. I am not aware of any previous record of their occurrence in this district.—CHAS. SMETHURST, 25, Chatham-street, West-street, Leeds, Nov. 25th.

FLORA OF SURREY.—Mr. A. Bennett, of High-street, Croydon, Surrey, has favored us with a printed list of the plants reported to occur in the five counties adjoining Surrey, but not certainly known to occur in that county. It is published as a first step towards a proposed supplement to the flora of the county, and with the wish that those botanists who may be able to help will kindly do so, either in confirming by specimens, any

doubtful plants, reported for the county, or by giving the localities where they were gathered, so that search may be made next season for them. We gladly give publicity to this notice, and trust that such of our subscribers as can assist Mr. Bennett in the way suggested, will furnish the required information. The catalogue will be lent by us to any botanist requiring it, on receipt of a stamped and addressed newspaper cover, to be retained seven days.—EDS. *Nat.*

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting Dec. 11th, the president, Mr. T. Lister, in the chair.—A report from the entomological section of interesting papers read by Mr. John Harrison. Of those observed recently were *Acronycta leperina*, *Celaena Haworthii*, *Notodonta camolina*, *N. dromedarius*, &c. In ornithology the chief records are: Oct. 27th, wild geese, feeding stubble at Hoover; 28th, redwings, and fieldfares 31st, near Ackworth; Nov. 22nd, large flocks of golden and green plovers on the Dearne Meadow, Day House, and Monk Bretton; Nov. 20th, a male sparrow hawk carried off a sparrow from a flock in Regent-street, another stunned itself against a window within which hung a canary, at Heresforth Hall—the frost bringing them so near to the haunts of man. On the 27th, wild geese were seen flying by moonlight over Barnsley, and on Dec. 2nd over Clayton West; grey wagtails also observed there. Pochards were observed at Hemsworth Dam Nov. 27th; these and other water-birds numerous at times this season.

BRADFORD NATURALISTS' SOCIETY.—Meeting Nov. 11th, the president in the chair.—Mr. W. West gave a lecture on “Mosses,” illustrated by herbarium specimens. Mr. J. Hirst exhibited *H. pennaria*, &c., from Shipley Glen; Mr. Hodgson, *H. defoliaria* and *E. tiliaria* from Bingley, the latter new to the district record list.—J. W. CARTER, Hon. Sec.

MEETING Nov. 25th, the president in the chair.—Mr. J. W. Brook read an interesting and instructive paper on “The Fertilization of Flowers.” Mr. J. Hirst exhibited *D. templi*, taken from a gas-lamp at Manningham, and new to the district record list. Other local insects were shown by Messrs. Carter and Wardman, and a collection of dried plants by Mr. Richmond.

FIFTH ANNUAL MEETING, Dec. 8th, the president in the chair.—The annual report read by the secretary showed the society to be in a prosperous condition. The election of officers for the ensuing year then took place, Mr. Jagger being re-elected president, and Mr. Carter corresponding secretary. Mr. Fletcher exhibited a number of local lepidoptera, and Mr. Hodgson several specimens of the American cockroach (*Blatta Americana*), found in large numbers in a dyehouse near Bradford.

SECOND ANNUAL SOIREE, Dec. 16th, the president in the chair.—After an excellent tea, the president delivered a short but appropriate address

on the advantages to be derived from the study of Natural History, and in the course of his remarks alluded to the Yorkshire Naturalists' Union. Mr. Roebuck of Leeds replied, setting forth the work being done at present by the Union in the investigation of the fauna and flora of the county; and referring to the publications (Transactions) at present being issued, solicited the assistance—in the shape of subscriptions, &c.—of all present.—J. W. CARTER, Hon. Sec.

DEWSBURY NATURALISTS' SOCIETY.—Monthly meeting, Dec. 18th, Mr. J. Farnhill in the chair.—Mr. P. F. Lee read a paper on "The Morphology and Physiology of Plants," which was illustrated with the microscope, diagrams, and specimens from the society's herbarium.—H. BREARLEY, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, Dec. 1st, Mr. J. E. Garside in the chair.—Mr. J. Fielding showed two live tortoises (African and American); B. Garside, moorhen and lapwing; C. C. Hanson, egg of ostrich and common wren; R. W. Calvert, belemnites. The annual meeting was fixed for Jan. 5th.—W. HY. STOTT.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—361st meeting, Nov. 18th, Mr. E. E. Prince in the chair.—Mr. Walter Raine exhibited a fine skin of the great grey shrike, also eggs of the common skua, Buffon's skua, Richardson's skua, great black-backed gull, and little auk. Mr. W. H. Hay, a skin of the red-winged starling, from America. He described its habits as observed by him in Canada, and stated that towards the winter these birds congregate in flocks, as does our common starling.

362ND MEETING, Nov. 25th, Mr. W. Barwell Turner, F.C.S., in the chair.—He exhibited *Glaeocapsa polydermatica*; Mr. F. Emsley, the red form of *Protococcus pluvialis*, some Mediterranean foraminifera, a Californian zoophyte, and the larva of *Corethra plumicornis*. The eggs of the common black slug were shown by Mr. Henry Marsh. Mr. Washington Teasdale exhibited a very simple apparatus for displaying the spectral colours from a reflecting plate. Mr. John Grassham, a pair of Pomarine skuas, adult and young, shot on the coast near Bridlington. Mr. Walter Raine, some rare birds' eggs, including those of the great plover from Norfolk, and of the avocet, which used formerly to breed in the fens.

363RD MEETING, Dec. 2nd, Messrs. B. Saynor and B. Holgate, F.G.S., in the chair.—The latter exhibited a number of specimens (fossil and other) from the Cambridge Greensand, and made some interesting remarks on them. Mr. C. H. Bothamley showed various minerals. Mr. Washington Teasdale, a section of *Loftusia persica*—a fossil which represents a gigantic type of arenaceous foraminifera. Mr. F. Emsley, various animalculæ from the canal. Mr. C. Smethurst, living examples of *Chelonia caja*, bred in the house in the last week in November; one was a dark variety, with the light markings of a cream colour and very small.

Mr. H. Marsh, some well-preserved larvæ, pupæ, and imagos of various lepidoptera. Mr. J. R. Murdoch, a large number of lichens, collected at New Galloway, N.B., by Mr. James MacAndrew, after whom one of them—*Lithographis Andrewii*—was named. Mr. James Fogg, a snow bunting, in immature plumage, taken at Spurn Point, and also a black guillemot. Mr. W. E. Clarke exhibited some parts of Sharp & Dresser's "Birds of Europe"—a magnificent work. The Vertebrate Section re-elected their officers for 1880, Mr. W. E. Clarke being president, and Mr. W. H. Hay, secretary.

364TH MEETING (the 10th annual meeting), Mr. Edward Atkinson, F.L.S., president, in the chair.—The officers for 1880 were elected, Mr. Benjamin Holgate, F.G.S., being president; the secretary, Mr. Wm. Denison Roebuck, was re-elected. The annual reports and balance sheets having been passed, the president gave his valedictory address, and after some votes of thanks the meetings were adjourned to Jan. 27th, 1880.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, Mr. John Whitehead, president, in the chair.—The correspondence read by the secretary included a letter from the Rev. J. Fergusson, who enclosed for the reference collection a set of British *Grimmias*, comprising about 30 species and varieties. The specimens brought for exhibition included the rare *Gymnostomum tenue*, discovered in fruiting condition by Mr. Cunliffe, at Styal, in October. The same moss had also, it was stated, been found barren at Ashley Mill. It had not been observed in either of the localities named until this year. The president had received, through Mr. Hobkirk, an Austrian specimen, which he exhibited, of *Thuidium pulchellum*, a species rare in Europe, being previously known to exist in only one locality. Another object exhibited by the president was a fragment of *Hylocomium splendens*, in a semi-fossilized state, taken from old lake dwellings at Lochlee, near Kilmarnock. The specimen was originally sent to Mr. Hobkirk for identification, by Prof. Bayley Balfour, and was interesting from its apparently semi-carbonised condition.* Along with it were picked up some articles of rude workmanship, including what appeared to be a plaited girdle, composed of the wiry stems of *Polytrichum commune*. Mr. Entwistle exhibited an interesting collection of dried exotic ferns, including *Polypodium minus*, a native of Borneo, not known until very recently.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Dec. 10th.—Mr. T. Wilson exhibited a fine series of *Boarmia abietaria* and *cinctaria*, both species bred; also a fine variety of *Ypsipetes elutata*. The honorary secretary, Mr. Prest, a specimen of *Mixodia rubiginosana*—a very rare *Tortrix*, and hitherto only taken in Scotland; it was taken by him at Witherslack in June last; also a fine series of very dark *G. obscurata*—a form only taken in the New Forest; also specimens from near Lewes, very nearly white, where it occurs upon the chalk.

* See page 84.

Diary.—Meetings of Societies.

- Jan. 2. Goole Scientific Society : Paper, on "Ferns."—Mr. W. N. Cheesman.
,, 6. Liversedge Naturalists'. Bishop Auckland Naturalists'.
,, 7. Wakefield Naturalists'.
,, 8. Huddersfield Scientific Club.
,, 14. York and District Field Naturalists'.
,, 15. Dewsbury Naturalists'.
,, 16. Goole Scientific : Paper by Mr. R. S. Best, F.C.S.
,, 17. Yorkshire Naturalists' Union.—Annual Meeting.—(See Advertisement, page 4).
,, 22. North Staffordshire Naturalists' Field Club.—Meeting at Longton.
,, 26. Lancashire and Cheshire Entomological.
,, 27. Leeds Naturalists', &c.—Annual Meeting : Inaugural Address by the president, Mr. Benjamin Holgate, F.G.S.
,, 29. Selby Naturalists'.—Annual Soiree.—Address by Canon Raine.
,, 30. Goole Scientific : Paper by Mr. Samuel Drew, F.R.S., of Edinburgh.

BIRDS OF YORKSHIRE.

Information is earnestly requested relating to that portion of the Order *Passeræ* contained in the following genera : *Laniidæ*, *Muscicapidæ*, *Oriolidæ*, *Cinclidæ*, *Turdidæ*, *Sylviidæ*, *Troglodytidæ*, *Certhiidæ*, *Sittidæ*, *Puridæ*, *Panuridæ* and *Ampelidæ*, (Shrikes, Flycatchers, Oriole, Dipper, Thrushes, Warblers, Wren, Creeper, Nuthatch, Titmice, and Waxwing). It is hoped that contributions will be sent from all parts of the county, giving not merely a list, but if possible, and it is desired, remarks on the residents, migrants, rare and occasional visitants, &c., &c. ; also the absence or rarity of any common species in certain districts, and the boundaries of the districts alluded to in all cases. The compiler is particularly anxious to work out the distribution of species. All assistance will be duly acknowledged.

All communications are requested to be written *on one side of the paper only*.
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Annual Meeting

HUDDERSFIELD,

17th JANUARY, 1880.

The Annual Meeting of this Society will be held in the Lecture Hall of the Literary and Scientific Society, South Street, Huddersfield, on the above date. Agenda :

COUNCIL MEETING	.	.	2-30 P.M.
SECTIONS	.	.	3-30 P.M.
GENERAL MEETING	.	.	4-15 P.M.

Tea 1/3 each, in Victoria Hall, Buxton Road, at 5-30 p.m.

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W. DENISON ROEBUCK,

GEORGE BROOK *ter.*,

Hon. Secs. Yorkshire Naturalists' Union.

E. FOSTER BROOK,

Hon. Sec. Huddersfield L. & S. Society.

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AND

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No. LV.

FEBRUARY, 1880.

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Original Articles.

NOTE ON THE ANTIQUITY OF *MUSCI*.

BY F. BUCHANAN WHITE, M.D., F.L.S.

I READ my friend Mr. Hobkirk's note on this subject [page 84] with much pleasure, and though I have long ceased the active study of mosses (one can't do everything !), I am tempted to say what I know on the matter, the more especially as Mr. Hobkirk asks for information.

Taking the records of mosses that have any claim to be entitled "fossil" or "sub-fossil," in the order of their geological age, and beginning with the youngest, some of the mosses that are preserved in various of our peat-beds will come first. Generally the soft constituents of peat are so decayed and broken up, that it is impossible to say what these have specifically been, but in some cases they are sufficiently well preserved to be determined. For example, Mr. Skertchley, in his "Fenland," mentions the occurrence of *Hypnum fluitans* beneath three or four feet of peat, in Norfolk, and is inclined to think that the age thereof has been much under-estimated.

Perhaps not older than this Norfolk *Hypnum fluitans*, and quite possibly dating from as recent a period as post-Roman times, come the mosses of the Lochlee "crannog." Mr. Hobkirk will perhaps deprecate this attempt to rob him of his long-sought fossil moss, but, in view of the other "finds" at the crannog, including various metallic implements, it is evidently a comparatively recent structure, and may even be as I have said, of post-Roman date. As I do not pretend to be a geologist to any greater extent than every naturalist should be, I ought perhaps to say that for all the geological statements put forward in this paper I have the eminent authority of Dr. James Geikie.

Much older than the above are some mosses found by me in an old peat-bed on the banks of the Tay, near Perth. These mosses are *Thuidium tamariscinum* and what appears to be *Hypnum cuspidatum*. These I exhibited at the Dunkeld Conference (1877) of the Cryptogamic Society of Scotland, but I think that I have not otherwise recorded their occurrence. The peat-bed in question is very extensive, and lies under a varying depth of carse-clay, the depth at the place where I found the mosses being fifteen or twenty feet. Along with the mosses were remains of various higher plants, such as oak, pine, *Salix*, seeds of *Menyanthes*, and stems of *Scirpus*, &c. There were also

numerous wing-cases of *Coleoptera*. In some places the trees have evidently grown on the spot where their remains now lie, in others they have drifted to it. On the same bed of peat, but in another place, we saw an ancient canoe, which affords probably the oldest evidence of the existence of neolithic man in Scotland. Similar canoes have been found in the Forth and Clyde valleys, but these were imbedded in the carse-clays, while the Tay canoe lay below these clays, and is hence presumably more ancient. The age of this peat-bed, or, as it may be termed, buried forest-bed, is what Dr. Geikie terms middle post-glacial, when Britain was still joined to the continent of Europe, and when there was a genial climate and a great growth of forest trees, even in places, such as on the higher hills and in the islands, where trees will not now grow. At this time it is probable that our south-western flora received its peculiar Iberian character, as shown in the Cornish species of *Ericæ*.

Cœval with this buried forest of the Tay, or perhaps a little earlier, are the mussel-beds of Spitzbergen. (Perhaps I should mention that these mussels—the common *Mytilus edulis*—are not now found in Spitzbergen in a *living* condition, but are like some of the mosses, which do not grow there now, evidences that the climate there was once more genial than it is now, just as the Suabian mosses, enumerated below, are records of an arctic climate in Suabia.) In these a goodly number of mosses have been found, and are recorded by Prof. Oswald Heer, in his “Die Miocene Flora und Fauna Spitzbergens.” The mosses were determined by Prof. Schimper, and are the following :—

Dicranella cerviculata, Hedw.
 Dicranum arcticum.
 D. congestum, Brid.
 D. sp. (?)
 Cynodontium (like gracilescens).
 Trichostomum Nordenskiöldi,
 Schpr., allied to T. tophaceum.
 Webera Ludwigii, Spr., var.
 angustifolia.
 Bryum purpurascens.
 B. pallens, Sw.
 B. bimum, Schreb.
 B. lacustre, Bland.
 Cinclidium stygium, Sw.
 Paludella squarrosa, L.
 Timmia megapolitana, Hedw.

Polytrichum strictum, Hedw.
 P. sexangulare, Hoppe.
 Mnium subglobosum, B. & S.
 Hypnum fluitans, L.
 H. revolvens, Sw.
 H. hamulatum.
 H. molle, Dicks.
 H. nitens, Schreb.
 H. stellatum, Schreb.
 Limnobium Nordenskiöldi, Schp.
 allied to H. palustre.
 Pterogonium or Leskea, sp.
 Aulacomnium turgidum, Wall.
 A. palustre, L.
 Sphagnum acutifolium, Ehrh. (?)

The next mosses that have been recovered date from inter-glacial times, and were found in the lignites, or brown coal, of Dürnten and Mörschweil, in Switzerland. They were determined by Schimper for Heer, and are mentioned by the latter in his "Primæval World of Switzerland." With one exception they seem to be all extinct species, though the flowering plants with which they are associated are all, except one, species still living, and many of the animals are also still existent. The mosses are—*Sphagnum cymbifolium*, *Hypnum lignitorum*, Schpr. (allied to *H. palustre*); *H. priscum*, Schpr. (very like *H. sarmentosum*); *Hypnum* sp., (representing *H. stramineum* and *H. trifarium*); *Thuidium antiquum*, Schpr. (closely related to *T. delicatulum*).

A little older than these Dürnten mosses is one mentioned by A. Nathorst in his paper, "Om den arktiska vegetationens utbredning öfver Europa norr em Alperna under istiden," as having been found associated with *Salix polaris*, in the earliest glacial beds of Norfolk. This is *Hypnum turgescens*, Schpr., which is also found in Greenland, Spitzbergen, Nordland, &c.

Dr. Hermann Credner records in his "Elemente der Geologie" the following mosses as having been found in a Palæolithic deposit in the lowland of Suabia:—*Hypnum sarmentosum*, *H. groenlandicum*, and *H. fluitans*, var. *tenuissimum*. It will be noticed that these are all arctic or alpine species.

We now make a jump to miocene times, when *Muscites Berggreni*, described and figured by Heer in the work cited above, grew in Spitzbergen. At this time also three species grew in Switzerland, as Heer records in his "Primæval World," but as he does not give their names I cannot mention them. I fancy they are described in his "Flora tert. Helv.," as the above-mentioned *Muscites* is said to be like *Hypnum Schimperii*, Heer, Flora tert. Helv. p. 28. I imagine the latter to be one of the mosses alluded to in the "Primæval World."

Perth, Jan. 5th, 1880.

NOTES ON BIRDS OBSERVED IN DUTCH BRABANT.

(Concluded.)

BY WM. EAGLE CLARKE.

Kestrel.—Breeds in the plantations. The sparrow-hawk was not observed.

Hen Harrier.—A pair or two on all the heaths, consequently this species was seen daily. Its flight struck us as particularly laboured, being

slow and flapping. Their appearance upon the scene usually called for unmerciful bullying on the part of the curlews and peewits, and a single bird of either species seemed quite able to cause them anxiety, no resistance being offered. This species is a late breeder, consequently no eggs were obtained. A last year's nest from which three young in down had been taken in July, 1878, was shown us by Adrian Mollen, junr.; it was a small structure among bog-myrtle on the heath, and composed of heather stems. The light ashly plumage and black primaries of the old male make him both beautiful and conspicuous.

Little Owl (*Steenuil*, *Kleinuil*).—Three nests with eggs were obtained by us. The first was taken on the 11th, the situation being a rabbit's burrow in a pine plantation, where the trees were thinly scattered. The eggs, three in number, were about four feet from the entrance, and laid upon dead needles from the pines. Attention was attracted to the burrow by the fact of a dead mouse lying at the entrance. A second was found as some woodmen were removing a pile of felled timber, under which, on the bare ground, was an old bird sitting on her four eggs. The former allowed herself to be taken off the eggs, and both are now in my collection. The third lot of eggs, two in number, were simply laid in a hole in an old birch stump; castings consisting of the elytra, &c., of beetles being found on the tree. The bird was occasionally observed on the wing at dusk.

Barn Owl.—Only one observed. It was sitting in a pine tree.

Great Grey Shrike (*Klaauwier*, *Klapekster*).—This species frequents the heaths, where it preys upon the numerous crickets, and nests in the small detached pines. Each pair has its own limited district, and does not allow others of its species to trespass upon it. During our stay we obtained several nests, all in such situations. The nest, placed about five feet from the ground, is a considerable structure of grass and a profusion of feathers. One nest had a quantity of fine heather, rag, string, and worsted in its composition. The usual number of eggs was seven. This bird is shy, and, with the exception of once or twice observing it hawking for crickets and on the nest, was not to be seen.

Red-backed Shrike (*Graauwe Klaauwier*).—The first bird seen after leaving England. On going on deck on the morning of the 6th, at 4-30 a.m., the first object I saw was a splendid male, which seemed very tired, and allowed me to approach within a few feet

before fitting to another part of the steamer. On coming within sight of the Dutch coast it left the vessel. This bird was no doubt migrating. Although frequently observed in the vicinity of villages, it was not nesting during our stay.

Woodchat Shrike (*Roodkoppige Klauwier*).—A male observed on the 17th. This was the only occasion on which the species was observed. According to Mollen it breeds not uncommonly near the villages.

Spotted Flycatcher.

Pied Flycatcher.—Many were seen together on the 14th in a plantation near Waalre—the only occasion.

Golden Oriole (*Wielewaal*).—This beautiful bird arrived at Valkenswaard on the 11th. After this date we heard its oft-repeated wild flute-like song, and caught occasional glimpses of its rich dress.

Mistletoe Thrush (*De Groote Lijster*).—One nest found; the bird was not observed.

Song Thrush (*Zanglijster*).—Strange to say, neither the bird nor the nest seen. Eggs were observed in a local collection.

Blackbird (*Zwarte Lijster*).—Not common.

Ring-Ouzel (*Domine*).—A straggler seen on the heath on the 11th, a very late date. It is observed here as a bird of passage only.

Hedge-Sparrow (*Boeren-nachtegaal*).—This familiar bird was conspicuous by its rarity. Not a single bird was observed, but a nest and eggs found, unmistakably belonged to this species.

Redbreast (*Roodborstje*).—Another rarity. Bird again not seen, but a nest with eggs was observed in the possession of some boys.

Nightingale.—First heard singing on the evening of the 12th; after this it became one of the commonest songsters both by day and night.

Bluethroat (*Blaauwborstje*).—The bluethroat found in Holland is the one with the white spot in the centre of the blue on the breast. It is not uncommon, but is seldom seen, for frequenting the willow-garths, it is able to pop out of sight instantly. Several nests with eggs were obtained on the 11th, all of which latter were considerably incubated, proving the species to be an early breeder. The site of the nest (which is composed of bents, grass and moss, lined with fine grass) is at the foot of trees, on the side of a grip or bank.

in the willow-garths. We had difficulty in obtaining fresh eggs. The eggs are of a uniform brownish-green colour, and cannot be mistaken for those of any other species.

Redstart.

Black Redstart (*Zwartroodstaartje*).—One of the first birds seen on our arrival at Valkenswaard on the 6th, and the same pair were observed daily on the trees close to our windows at the inn. Their nest was subsequently found on the roof of an adjoining barn. A nest, with eggs, taken on the 15th, was situate in a bank.

Stonechat (*Roodborstje-Tapuit*).

Whinchat (*Paapje*).

Wheatear.—Numerous. Many eggs were obtained from nests in bank sides, some of them being of a milk-white colour.

Great Reed-warbler (*Groote Karukiet*).—This fine warbler was first seen on the 8th. It was not, at the time of our visit, very numerous, and seemed to be confined to the banks of the Tongreep, where it delighted in the sallows.

Reed Warbler.—One nest found on the 17th, ready for eggs.

Sedge Warbler.

Grasshopper Warbler (*Sprinkhaan rietzernger*).—An abundant species. Two nests found on the thick grass on the 17th. One of the eggs obtained, now in my collection, is an exceedingly fine specimen, and has a zone of rich markings at the larger end.

Whitethroat.

Lesser Whitethroat.

Garden Warbler.

Blackcap.

Willow Wren.

Chiffchaff.

Wren (*Winterkoning*).

Tree-creeper.

Great Titmouse.

Blue Titmouse.

Cole Titmouse (*Zwarte Mees*).

Marsh Titmouse (*Zwartkopimees*).

Crested Titmouse.—Two nests of six and seven eggs were obtained. In both instances the females were snared on the nests, which were placed in tree stumps. One of these nests in my collection is a

most beautiful and compact structure, composed outwardly of fine moss, and lined with the finest grey animal down, so finely interwoven as to resemble felt.

Longtailed Titmouse.—The species found in Holland, of which we obtained numerous beautiful nests and eggs, is not of the same species as that inhabiting Britain, but may be distinguished from it by the ever-present white head of the mature bird. In Sharp and Dresser's "Birds of Europe," the name given to this species, which has occurred twice in England, is *Acredula caudata*; whilst the British species, which is not yet known to have occurred in Europe, is given the name of *A. rosea*. We examined several birds caught on the nest, and considered that the snow-white head made this a much handsomer bird than his British cousin.

Pied Wagtail (*Kwickstaart*).

White Wagtail.—More common than the pied species. Three nests with eggs obtained, all of which were thoroughly identified by watching the bird to the nest, and in one instance the old bird was caught on the nest. All the nests were placed in stacked sticks, in villages, and were loose in structure, and composed of bents, a small quantity of heather, and numerous feathers; number of eggs, five.

Blue-headed Wagtail (*Gele Kwickstaart*).—A beautiful bird, rivalling our grey wagtail—superiority of colour making up for what is lost in form. Two pairs were observed on the 10th at a few yards distance. In the male the blue head and intense yellow of the breast make him a fine fellow. The female resembles him, but is not so bright in colour.

Yellow Wagtail.—Common. A nest found on the 17th contained a cuckoo's egg.

Tree Pipit.

Meadow Pipit.

Skylark (*De Leuwerick*).

Woodlark (*Boom leuwerick, Loittentoit*).—Plentiful. Conspicuous on the wing by its short tail, broad wings, and pleasant song. Several nests were found.

Yellow-Hammer.

Reed Bunting. This was the commonest bird observed. Four nests containing young were found on our first day's nesting (the 7th), so that this species is an early breeder. Male birds were observed sitting on the eggs.

Ortolan Bunting (*De Ortolan*).—Noticed in the collection of Adrian Mollen, who informed me that it bred at Valkenswaard.

Chaffinch (*De Vink*).

Goldfinch.—A nest and eggs found. Bird not seen.

Linnet.

Tree Sparrow.

House Sparrow.

Greenfinch.

Bullfinch.

Starling.

Carriion Crow (*Craai?*).—Very numerous. A fine series of eggs obtained.

Rook.

Jackdaw.

Magpie (*Ekster*).—Everywhere. A nest found in a sallow bush in the marsh, was only three feet from the surface of the water. The eggs from this nest were the finest in size and richness of marking that I have seen. Other nests observed in the stunted pines quite out on the heaths.

Jay (*De Vlaamsche Gaai*).—Very common. Nests in the pine plantations; the general number of eggs was found from five to seven. Some nests were not more than five feet from the ground.

Green Woodpecker (*De Groene Specht*).—The harsh laugh and undulating flight of this bird were often both heard and seen. A nest got on the 13th, was in the heart of a solid ash tree, and took a Dutchman four hours to chop it out, when only two eggs were found. (In Adrian Mollen's collection we saw greater, middle, and and lesser spotted woodpeckers.)

Wryneck.—The peculiar kestrel-like note of this species was heard on the 13th.

Hoopoe (*De Hop*).—Not a numerous species in this district. On the 14th, when near the village of Aalst, a boy made us to understand by signs, &c., aided on our part by the little Dutch we had picked

up, that he had observed a "hop" enter a hole in a tree, and that he had made it a prisoner by stopping the hole with grass. After a mile's walk we arrived at a garth composed entirely of pollard oaks, about four or five feet high, and the lad pointed to a hole, about two feet above the ground, in one of the oaks. We removed the grass carefully, and placing a butterfly net over the hole, endeavoured to make the bird leave by repeated blows and kicks on the tree, but this proving unavailing, we set to work with a chisel and chopper, and after a tough task were enabled to take the bird out from the hole made. I need not relate what followed, let this suffice—it is now in the collection of a Leeds friend. At the bottom of the hollow was a premature egg, of a pale lavender-white colour, in a broken condition. It had, no doubt, been laid owing to fright, no sign of a nest being found.

Turtle Dove.—Often seen; too early for eggs.

Partridge.

Golden Plover.—A pair in full breeding plumage was observed on two occasions.

Lapwing.

Heron (*Riga*).—Very numerous in the marshes, but does not breed near Valkenswaard. Adrian Mollen informed me that at Loo, in Guelderland, there are 2000 nests annually.

Curlew (*Wulp, cülda*).—Very numerous. Nesting on the heaths.

Redshank (*Tureluur*).—Not numerous.

Wood Sandpiper.—Perhaps half-a-dozen pairs of this species were noticed. It hovers at a considerable height above the marshes, uttering a short, oft-repeated, not unpleasant note, quite worthy of being called a song. Two nests were taken—one on the 11th with four eggs, and another on the 17th with two eggs. They were found among the heather on the banks of the Tongreep.

Black-tailed Godwit (*Grütto*).—Not at all numerous. Whilst searching the Dommel marsh on the 16th, one got up at a great distance, and flew away uttering its note "grutto, grutto." In the course of ten minutes it returned, and our suspicions were aroused that it had a nest. Getting out of sight for a few minutes, we allowed her time to settle down. On our showing ourselves she again rose; and although we searched thoroughly, we were unable, owing to the distance at which the bird rose from us, to find the nest. We got concealed several times, but with the same result, so decided to

leave the locality for a few hours. On returning, the bird rose when we were nearly half-a-mile off. It now began to rain heavily, which was an advantage, for now she could not leave her eggs long. Lying in the heather in our mackintoshes, a few hundred yards from where we knew the nest must be, we waited for a quarter of an hour. This time, the exact spot from which the bird rose was detected, and the nest found. It occupied a tussock of dry grass, standing six inches above the surface of the water, in a small shallow lagoon. It was composed of dry grass, and contained four fresh eggs. On other occasions we put up this species in the marsh, when it proved to be a very noisy bird.

Ruff-and-Reeve (*Kemphaar*).—Observed, but far from numerous. No eggs had been laid up to the date of our departure.

Common Snipe (*Snip*).—Only two seen.

Jack Snipe.—A pair seen on the Tongreep marsh on the 7th.

Spotted Crake (*Klein Waterhen*).—A most abundant species in the Tongreep marshes, but the nest in these extensive swamps is very difficult to find. The old birds, whilst you are traversing their haunts, will run about your feet, and with great difficulty can be made to rise, and then they flutter on weak wing for a yard or two only. I purchased a bird from some boys, which had been caught by a dog. On the 11th, whilst striding from one tussock to another, a crake slipped off her nest, which was quite under my foot. How she escaped death I cannot tell. The tussock was a tall one of green marsh grass, standing two feet above the surface of the water; in the centre was a hollow, lined with short pieces of dry grass, each about two inches long, in which were thirteen eggs, two of which were broken by my foot. After this we found several nests, and I noticed that when the situation was very wet, the bird made a considerable nest of dry grass. Sometimes the nest and eggs were in the water, and quite buried under tangled grass of the marsh.

Moorhen (*Waterhen*).

Water Rail (*Waterral*).—Perhaps not quite so numerous as the spotted crake, and confined to the marshes of the Dommel. A fair series of eggs were obtained from nests of grass, placed in dry tussocks in shallow water. Eggs eight and ten in number.

Shoveller (*De slobbeend*).—This species was observed on the Tongreep.

Pintail Duck (*Pijlstaart*).—This species was easily distinguished when on the wing by the long attenuated tail. It was scarce, and con-

fined to a few pairs remaining to breed. On the 11th we had the good fortune to find a nest with eggs on the heath where the heather was very thin, and not far from several lagoons. The old bird "wriggled" off her nest quite at our feet. It contained seven eggs much incubated, and consisted of a depression surrounded by a great quantity of down plucked from the breast of the bird, which was held together by numerous particles of a green lichen, so common on heaths, and was therefore a most beautiful object. It is now in my collection.

Common Wild Duck (*Wilde annt*).—Numerous, and nesting in the long grass of the marshes.

Teal (*Winter taling*).—Very numerous. A quantity of eggs obtained on the heaths.

Garganey (*Zomer taling*).—Not uncommon. A nest found by us on the 7th contained ten eggs; it was placed among heather about five inches long, close to the ground, and composed of broad dry grass surrounded with down. The eggs were of a rich cream colour. The bird rose when we were only a few yards from the nest.

Black Tern (*Zwarte stern*).—A flock of this elegant species was always to be seen hovering in graceful evolutions over the Tongreep. They breed in company on the swampy islands, but the date of our departure was a few days before the usual time for this species to have eggs.

Black-headed Gull.—Only a few seen.

Leeds, December, 1879.

Short Notes and Queries.

BLACK-THROATED DIVER NEAR HALIFAX.—Dec. 15th, 1874, James Sunderland shot on the Albert Reservoir, at Halifax, a black-throated diver, the most perfect specimen I ever saw, an adult male in full plumage. On the 3rd of January, 1880, the same man, on the same sheet of water, shot a female of the same species, in good plumage. I have seen both birds. The little grebe and kingfisher have been seen on the Calder, at Elland. I never saw birds so scarce as they are this year.—C. C. HANSON.

Larentia ruficinctata IN YORKSHIRE.—Mr. J. W. Carter, of Bradford, has sent me for determination a specimen of this insect taken on Malham Moor, August 27th, 1876. I believe a specimen was taken some years ago on the moors near Huddersfield, but it seems to be an exceedingly rare species in Yorkshire.—GEO. T. PORRITT.

Fauna OF NIDDERDALE.—Can any reader of the *Naturalist* furnish authentic information as to whether any of the following species of mammalia and birds occur in the drainage basin of the Nidd?—the great bat, the common weazel, the stoat, the longtailed field-mouse, the common rat, the water shrew, the peregrine falcon, the hobby, the barn owl, tawny owl, long-eared and short-eared owls, the black-cap, sedge warbler, grasshopper warbler, and garden warbler. None of these appear to have been recorded for any part of this extensive valley. While on the subject I will add that I shall be glad to see information of any kind with respect to the *Fauna* of Nidderdale in any of its branches.—WM. DENISON ROEBUCK, Sunny Bank, Leeds.

Anemone nemorosa VAR. *cærulea*.—It is surprising that so beautiful and distinct a variety as the above plant should be, without exception, entirely overlooked by writers of our descriptive English Floras. Many describers mention the common "purple" variety, but none a blue one, and blue the present plant undoubtedly is; its color being very little paler than that of typical *apennina*. It differs botanically of course, from the latter species, viz:—by its fewer and broader sepals, and its tuber being slender and nearly uniform, not knobbed at the end as in *apennina*. I believe this blue variety was once mentioned in an early number of the *Phytologist*, or another contemporary publication; but I have no knowledge of a more recent record. It has been found in several of the southern counties; it would be interesting to hear of its occurring further north, Yorkshire especially. Like *Anemone apennina* it shows variations of color, some plants being paler than others; but in its extreme form it differs very little from that species. —GEORGE WEBSTER, Holgate, York.

Rainfall for December.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·41	8	28·93	* 32·54	31	1·00
LEEDS ... (H. Crowther) ...	183	1·33	10	...	...	30	0·32
HALIFAX... (F. G. S. Rawson)	360	3·76	9	† 42·10	45·44	..	...
BARNSELY ... (T. Lister) ...	350	1·61	10	28·05	26·11	30	0·41
INGBIRCHWORTH (do.)	853	3·00	10	37·83	39·54	31	1·10
WENTWORTH CASTLE (do.)...	520	2·04	8	31·83	27·83	31	0·47
GOOLE ...	25	0·88	12	23·36	24·01	31	0·20

* This is the average to date for 13 years, 1866-78.

† The rainfall is 5·00 in. below the average of the last 10 years.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Annual meeting, 6th January.—The financial secretary read his report, which left a favourable balance in hand. The corresponding secretary read the general report for the past year, which was very encouraging. In ornithology Mr. Lister reported a few birds; during the intense frost birds were scarce. The robin sang in the severest frost. The missel thrush fed daily on berries of the mountain ash in the garden of J. Kaye, Esq., J.P., at Clayton West. The thrushes and blackbirds, which it drove away, were fed with spare food from the house. On Dec. 23rd goldfinches were seen at Horbury Junction by Mr. S. Gill. A flock of about 30 wild geese seen by Mr. G. Scholey and others flying over the town. Bullfinches were seen at New Park Spring and Worsbro' Gardens. The thrush was reported on Dec. 31st, in Craik's garden and Greenfoot, singing on New Year's day at Cockerham, and on the 6th the Rev. J. Metcalf reports its song at Gawber. Mr. E. Hailstone writes Jan. 5th of the missel thrush in song at Walton Park; 17th, tern flying over the lake, which is skimmed with ice—therm. 28°; 20th, teal on island near Walton Hall, tamed by the storm—therm. 22°, thick ice on the lake. The blackbird sang on the 5th and succeeding days. Jan. 2nd, kingfishers reported as seen by several observers on a warm pond; Skylarks sang at Christmas, reported by Mr. E. Brady, jun. The president gave his retiring address. T. Lister was elected president, C. Bellamy, corresponding secretary, and W. Barraclough financial secretary.—T. LISTER.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Annual meeting and dinner on the 5th Jan., the president, Mr. J. E. Garside, in the chair.—W. H. Stott (hon. sec.) read the report for the past year, showing the increase of members to be twenty-five, eleven new and valuable books had been added to the library, and one of Swift's microscopes had been acquired. The Society is in a prosperous condition. Officers for the ensuing year were elected, the president being Mr. C. C. Hanson, and the secretary and librarian were re-elected.—W. H. STOTT, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Annual meeting.—The officers were elected as follows:—President, Mr. S. L. Mosley; secretary, Mr. Geo. Brook, ter. The exhibits included a fine photograph of Plumpton Rocks, near Knaresborough, showing the stratification, &c., by Mr. C. P. Hobkirk. Mr. Mosley, several forms of *Abrazas grossulariata* from Bradford in 1879, one of them a fine example of the variety *Varleyata*; specimens of *Meliphora alveariella*, bred by Mr. C. S. Gregson of Liverpool, from figs: they were much redder in colour than the species when bred from its usual food, honeycomb; also larvæ of *Procris geryon*, from which hymenopterous parasites had emerged, showing the curious position in which the larvæ died (at the tip of a blade of grass) after the emergence of the parasites; also both sexes of *Calopteryx virgo* from Plymouth. Mr. G. T. Porritt showed *Dianthæcia Barrettii* from Howth: it had been taken there freely the last two seasons, but is not known to occur in any

other locality ; also *Ephestia cinerosella* and *Phycis subornasella*, recently received from Pembroke.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting, the president, Mr. S. J. Capper, in the chair.—In the absence of any paper, Mr. B. Cooke exhibited and distributed duplicates of the groups of *Hydradephaga* and *Brachelytra*, from his unrivalled collection of coleoptera : and Mr. A. Cooke exhibited both sexes of *C. exulis* and *E. lutulenta*, var. *luneburgensis*, taken near Loch Laggan, also several specimens of *E. grandævana*.

MANCHESTER CRYPTOGAMIC SOCIETY.—Annual meeting, 17th Dec.—This was made the occasion of a most interesting exhibition of objects illustrating the several departments of cryptogamic botany. The musci were represented by several valuable collections sent by members, such species as were especially interesting being displayed under microscopes. Mr. Peter G. Cunliffe had a splendid assortment of beautifully prepared slides, mounted by himself, amongst which were to be found all the rarer British species. A well-mounted series of pleurocarpous mosses was exhibited by Mr. Holt ; a collection of American seaweeds by the hon. secretary (Mr. Rogers) ; one of dried *Selaginellas* and *Lycopods*—a magnificent series—by Mr. Entwistle ; British lichens by Mr. John Leigh, M.R.C.S. ; hepaticæ by Dr. Carrington and Mr. W. H. Pearson ; microfungi by Mr. T. Brittain ; drawings of ferns, mosses, and other cryptogamia by Mr. Hardy ; and a series of nature-printed ferns by Mr. Forster. Amongst other things kindly lent for exhibition were the original MS. of Wilson's "Bryologia Britannica," and the author's private copy of that work, containing his sketches and memoranda as to different species. The greater part of the evening was occupied in the exhibition and private discussion of the objects above enumerated. Amongst those present were Dr. Carrington, of Eccles, distinguished for his labours on the hepaticæ, Dr. J. B. Wood, and other well-known students of cryptogamic botany. In the course of the evening Mr. W. H. Pearson, vice-president, took the chair, and after briefly indicating the more important objects in the room, called upon the hon. secretary, who read a report of the work done by the Society since it came into existence twelve months ago. The report specified in its general features what had been the Society's work during the year, and expressed indebtedness to the president (Mr. Whitehead) for the numerous facts which he had placed on record, and the exhibition of rare species of mosses which have come under his observation from time to time.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Annual meeting, Jan. 7th, the president in the chair.—The report for the past year was read and adopted. The following officers were elected :—Mr. J. Wainwright, F.L.S., president ; Mr. H. Sims, financial secretary ; and Mr. J. W. Shaw, corresponding secretary.

YORKSHIRE NATURALISTS' UNION.—The eighteenth annual meeting, held at Huddersfield, on the 17th January, was most successful throughout. The business meetings were held in the Lecture Hall of the Literary and Scientific Society. The Sections held their annual meetings at 3.30 p.m., resulting in the elections of the following officers:—Mr. Thos. Lister, of Barnsley (re-elected) president, and Mr. W. E. Clarke, of Leeds (re-elected), secretary of the Vertebrate Section; Mr. Wm. Cash, F.G.S. of Halifax, president, and Mr. J. Darker Butterell, of Beverley, secretary, of the Conchological Section; Mr. G. T. Porritt, F.L.S., of Huddersfield, president, and Mr. S. D. Bairstow, of Huddersfield (re-elected) secretary of the Entomological Section; Mr. C. P. Hobkirk, F.L.S., of Huddersfield, president, Mr. William West, of Bradford (re-elected) secretary for cryptogamic, and Mr. F. Arnold Lees, F.L.S., of Wetherby, secretary for phanerogamic botany, of the Botanical Section; and Prof. A. H. Green, M.A., F.G.S., of Leeds (re-elected) president, and Mr. James Spencer of Halifax (re-elected) secretary of the Geological Section. The general annual meeting was opened at 4.15 p.m., the chair being taken by the president, Dr. H. Clifton Sorby, F.R.S., Pres. G.S., &c. After the confirmation of the minutes, the list of additional subscribers was read, and thanks voted. The annual report was read by Mr. George Brook ter., F.L.S., secretary. It congratulated the members on the steady progress of the Union during the year, enumerated the meetings held, stated that the membership was about 1500 (with 26 societies), recommended invitations being extended to other societies, reported the publication of Part II. of the Transactions, and referred to the exhibition held at Leeds in January, 1879. The report also informed the members that, with regard to the proposed map of Yorkshire, Mr. E. Filliter, C.E., who had kindly undertaken to transfer the contour lines from the Ordnance maps, had made substantial progress, and might be expected to finish it in the ensuing year. The geological portion was, however, not reported in so forward a condition. The petition sent to Parliament against the enclosure of Maltby Common, the formation of a library for the Union, and the increase of the number of subscribers from 164 to 221, were also referred to; and the report concluded with an expression of the sense which the council entertained of the honour conferred upon the Union by Dr. Sorby's tenure of the chair for two years, and of the impetus thereby given to its prosperity. The balance-sheet showed an income of £86 10s. 9d., and an expenditure of £63 3s. 9d. The report and balance-sheet having been adopted on the motion of Messrs. F. A. Lees and S. L. Mosley, the excursion programme for 1880 was resolved upon, as follows:—Masham or Ripon, Easter Monday, March 29th; Malton, Whit Monday, May 17th; Barnsley, Saturday, June 12th; Boston Spa, Saturday, July 10th; Marsden, Monday (Bank Holiday), Aug. 2nd; and Market Weighton, Saturday, Sep. 4th. It was also resolved to have a special excursion in the autumn for the collection of fungi, several promises of assistance by competent

mycologists having been made, and the details as to time and place were left to be fixed by a small committee. The annual meeting was fixed for York, 15th January, 1881. Proceeding to the election of general officers for 1880, Dr. Sorby proposed as his successor in the presidential chair, Prof. W. C. Williamson, F.R.S., of the Owens College, Manchester—a Yorkshireman by birth and descent—stating that Prof. Williamson had consented to stand. The nomination was supported by several members, and received with enthusiasm by the meeting. The two secretaries (Mr. Geo. Brook, ter., F.L.S., F.R.M.S., of Huddersfield, and Mr. W. Denison Roebuck, of Leeds) were unanimously re-elected; and Messrs. A. Crebbin of Bradford, and C. W. Richardson of Wakefield, were also re-appointed auditors. It was then resolved that a class of honorary life members be created, for the reception of men of eminent scientific attainments who may have rendered signal service to the Union; and that their number be limited to twenty, of whom not more than two to be elected in one year. Dr. H. Franklin Parsons, F.G.S., late of Goole, was unanimously selected as the first of these honorary members, and afterwards a code of rules regulating future elections agreed to. Votes of thanks for the use of the rooms, to the auditors, the secretaries, and the president, brought the meeting to a close—the president, in reply to the vote, stating that the experience of the Geological Society of London was against the tenure of the presidency for more than a limited term by one individual. Tea was served at 5-30 p.m., and at 7 p.m. an adjournment was made to the Victoria Hall for the delivery of the presidential address, the remainder of the evening being devoted to the Annual Microscopic Soiree of the Huddersfield Literary and Scientific Society. The soiree was most brilliant and successful, and passed off well in every respect, the Union being much indebted to their Huddersfield constituents for so enjoyable a pendant to their annual meeting. About sixty microscopes were shown, from all parts of the West Riding, and the attendance was very crowded. Other attractions were provided, in the form of electrical experiments by Mr. H. Marriott of Huddersfield, a lecture on “Vortex Atoms,” with experiments, by Mr. C. Bothamley, of Leeds, paintings of butterflies by Mr. S. L. Mosley of Huddersfield, glass models of marine invertebrata, kinematic diagrams by Mr. Washington Teasdale of Leeds, and drawings of the battledore scales of butterflies by Mr. G. Brook, ter., F.L.S. The soiree was opened at seven o’clock by Mr. Geo. Jarman, F.I.C., president of the Huddersfield Literary and Scientific Society. Dr. Sorby then delivered his annual address to the Yorkshire Naturalists’ Union, taking for his subject “The Structure and Origin of Limestones,” afterwards illustrating his remarks by microscopic sections of those rocks. A vote of thanks to him was proposed by the Mayor of Huddersfield, seconded by Mr. Hobkirk, and carried unanimously, after which the company proceeded to the inspection of the numerous objects of interest shown.—W. D. R.

Diary.—Meetings of Societies.

- Feb. 2. Bradford Naturalists': Paper on "Fungi," Mr. Soppett.
" 2. Leeds Naturalists' Club, &c.
" 2. Liversedge Naturalists': Bishop Auckland Naturalists'.
" 2. Wakefield Naturalists'.
" 5. Selby Naturalists'.
" 6. Goole Scientific: Reports of Recorders.
" 10. Leeds Naturalists' Club, &c.
" 11. York and District Field Naturalists'.
" 13. Huddersfield Scientific Club.
" 16. Manchester Cryptogamic.
" 17. Gilchrist Lecture in the Armoury, Huddersfield, by Dr. Carpenter,
F.R.S., F.L.S., F.G.S.
" 17. Bradford Naturalists': Paper, "Additions to Local List of Lepi-
doptera," Mr. J. W. Carter.
" 17. Leeds Naturalists' Club, &c.
" 19. North Staffordshire Naturalists' Field Club.—Meeting at Leek.
" 19. Selby Naturalists': Paper, "British Ferns," Mr. P. Kendall.
" 19. Dewsbury Naturalists'.
" 20. Goole Scientific Society: Paper, "Sunbeams, and the work they do."
Mr. Thos. Rowney.
" 23. Lancashire and Cheshire Entomological.
" 24. Leeds Naturalists' Club, &c.
" 25. Gilchrist Lecture in Armoury, Huddersfield, by Prof. Williamson,
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Information is earnestly requested relating to that portion of the Order *Passeres* contained in the following genera: *Laniidæ*, *Muscicapidæ*, *Oriolidæ*, *Cinclidæ*, *Turdidæ*, *Sylviidæ*, *Troglodytidæ*, *Certhiidæ*, *Sittidæ*, *Paridæ*, *Parusidæ* and *Ampelidæ*, (Shrikes, Flycatchers, Oriole, Dipper, Thrushes, Warblers, Wren, Creeper, Nuthatch, Titnice, and Waxwing). It is hoped that contributions will be sent from all parts of the county, giving not merely a list, but if possible, and it is desired, remarks on the residents, migrants, rare and occasional visitants; &c., &c.; also the absence or rarity of any common species in certain districts, and the boundaries of the districts alluded to in all cases. The compiler is particularly anxious to work out the distribution of species. All assistance will be duly acknowledged.

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MARCH, 1880.

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Original Articles.

LINCOLNSHIRE COAST LEPIDOPTERA.

By G. T. PORRITT, F.L.S.

ENCOURAGED by the graphic description of the charms (!) of the Lincolnshire Coast, given by the Rev. W. Fowler, M.A., in his paper on "Lincolnshire Coast Plants," published at p. 129 of Vol. III. of this Journal, Mr. C. W. Richardson and myself determined to spend a few days investigating its lepidopterous fauna. The 16th July last, therefore, found us on our way, per Great Northern Railway, to Skegness, a place which until the last year or two had scarcely been heard of by anyone outside Lincolnshire, but which, thanks to the enterprise of the Earl of Scarborough, and the Great Northern Railway Company, seems destined to become, and that very rapidly, a popular seaside resort. Within the last few years several large hotels have sprung up; and there are already wide streets with well-built houses and villa residences in plenty; whilst all the ordinary seaside attractions are in contemplation, some indeed already in existence.

Though I have headed this paper "Lincolnshire Coast Lepidoptera," the title is rather a misnomer, as the whole of our collecting was confined to the neighbourhood of Skegness. Very likely, however, the misnomer is more apparent than real, for, as Mr. Fowler says, the coast is of wonderfully uniform character throughout its entire course; and, in all probability the insect fauna varies very little, less indeed than on any other equal extent of coast in Britain! Some variation would no doubt be found on the mudflats prevailing at different parts; at Skegness there being nothing but sand-hills. The little work which has been done at Cleethorpes, the only other part of its coast at which anything seems to have been done, quite confirms this supposition, allowance being made for its more northerly position.

Mr. Fowler, in the paper alluded to above has already given us a list of the various plants occurring on the coast, consequently, it is needless in this short article to again allude to them. Its lepidopterous fauna, on first thought, is rather peculiar, including, as it does, several species usually supposed to be fen or marsh insects only. The weather up to the time of our visit had been very wet and unsettled, but we were, nevertheless, very much surprised to find one such species, *Nudaria senex*, very abundant in spots which in fine weather we imagined would be like the Lancashire and other

sandhills, perfectly dry. *Herminia cribralis* too, another marsh moth, was common enough. In a few days, however, a satisfactory explanation had grown on us, for we found that however hot or dry the day might have been, the sandhills at night were always excessively wet, so that every evening we went out, we came in soaked through. This of course, whatever the natural cause of the moisture might be, was sufficient to account for the damp loving plants and moths.

Collecting in the daytime was dreary work, as there was not a decent species to be found. There was indeed very little variety, and the few species that did occur were of the commonest description, such as *Satyrus Janira*, *Chortobius Pamphilus*, *Lycæna Alexis*, *Zyzæna filipendulæ*, *Euchelia Jacobææ* and *Camptogramma bilineata*. These were all plentiful enough, but there was hardly anything else to be picked up, even as occasional odd specimens. Micro-lepidoptera were as scarce, one or two Crambites, several Tortrices and Tineina, with *Pterophorus pterodactylus*, being about all. We never, however, saw a *Pterophorus* so abundant anywhere as was this one here, for it actually swarmed in the hollows, flying in hundreds, and we could have netted any quantity. Some interesting coleoptera occurred, and the pretty hymenopteron *Pompilus plumbeus* was running about the sand; and the curious dipteron *Tetanocera marginata* was also taken.

The evening work was much more satisfactory. We usually put on the sugar shortly before dusk, and there being no tree trunks, we had to be content with sugaring posts and palings; fortunately there were plenty of them, and they made excellent substitutes. By the time this work was completed, the early flying moths were on the wing, the first to put in appearance generally being *Nudaria senææ*, which flew with a slow gentle flight just over the tops of the reeds, grasses, &c. No sooner had it got well on the wing than it was followed by *Herminia cribralis*, and a little later still by *Nonagria elymi*: these three species, though belonging to totally different families, flew in a very similar manner, and all were frequently taken on the same spot, within a few inches of each other. Whilst netting these at early dusk, a glance at a sugared post close by would now and then reveal a lovely *Chærocampa elpenor*, poised with wings vibrating so rapidly as to seem almost motionless over the post, the sugar from which was being sipped by means of its long outstretched proboscis. Soon afterwards we light up the lamps, and take our first round at the posts. Noctuæ are on them in profusion—quantity sufficient surely to satisfy anyone,—but the quality, - well, perhaps the less said about it, the better! For the number, probably never

did we see so common a lot, hardly a moth in fifty worth boxing, and still fewer worth setting; for whilst long series of common things might have been taken in splendid condition, most of the better things were wretchedly worn. The list following includes most of the species that visited the sugar:—*Leucania comma*, *impura* and *pallens*, plentiful; *Axylia putris*; *Xylophasia lithoxylea* and *polyodon*, in abundance; *sublustis* not common; *Mamestra anceps* and *albicolon* both common; *Apamea basilinea*, *Miana literosa*, *fasciuncula*, *strigilis* and *arcuosa*; *Tryphæna pronuba* with *Agrotis segetum* and *exclamationis* in swarms; *Noctua plecta* and *C-nigrum* not uncommon; *N. rubi*; one fine female *Aplecta occulta*; *Hadena oleracea* and *pisi* in plenty, with late straggling *thalassina*. Between the “rounds,” and after sugaring, we searched the reeds, grasses and low herbage with tolerable success. The most abundant moth in such situations was *Nonagria elymi*. This moth, although so comparatively recent an addition to our list, is evidently very abundant all along our coast, from Spurn in Yorkshire, right away to Norfolk. At Skegness we took nearly eighty specimens one night, but it was the only time anything like that number was reached. We also got in the same way plenty of *Nudaria senex*, and a fair sprinkling of *Herminia cribralis*, odd *Lithosia complanula*, *Eupithecia centaureata*, and a few very fine *Anerastia lotella* and *Homæosoma nimbella*. The most interesting species, however, was *Eupithecia innotata*, of which two specimens were secured. When, some years ago, Mr. Crewe proved that the *innotata* of our lists at that time was in reality not the Continental species known by that name, but a new one, which he named *fraxinata*, it was doubted if the true *innotata* did really occur in Britain, and the name was erased from our list.

Other species taken in various ways included—*Orgyia antiqua*, *Boarmia rhomboidaria*, *Hemithea thymiaria*, *Acidalia scutulata*, *interjectaria*, *imitaria* and *aversata*; *Timandra amataria*, *Larentia pectinitaria*, *Melanthia ocellata*, *Pelurga comitata*, *Noctua festiva*; *Caradrina Morpheus*, common and in fine order; a single fine *Mamestra abjecta*, the day before we came away,—evidently just appearing; *Caradrina blanda*; the local *Scoparia lineolalis*; *Crambus pratellus*, *tristellus*, *culmellus*, *perlellus*, and *Warringtonellus*. Writing of this *Warringtonellus*, I quite expect that when the larva of it and *perlellus* are thoroughly known, they will prove to be only different forms of one species. It is quite possible that the New Forest *Warringtonellus* may be distinct, as it seems much darker and more constant than these Lincolnshire specimens, besides not always being found in company with *perlellus*,

as is the case at Skegness and (as I also found it) in the Isle of Man.

The foregoing list of species is certainly very meagre, but it includes several very interesting ones, and there is no doubt that if the district were thoroughly worked, many rarities would turn up. Unfortunately there appear to be no lepidopterists residing in the immediate vicinity; but now that such facilities are given by the Great Northern Railway Company for travelling there at an exceptionally cheap rate from all our Yorkshire towns where the Company enters, there is no reason why some of the members of our Union, who can spare say two or three days each month from April to September, besides working up our own county (which of course stands first), should not do so. I am quite sure they would be well rewarded, and would have the additional and greater pleasure of adding to our knowledge of the fauna of a district in which so little has as yet been done.

Highroyd House, Huddersfield,
November 8th, 1879.

FURTHER ADDITIONS TO MR. W. B. TURNER'S LIST OF ALGÆ.

BY WM. WEST.

IN addition to those species of algæ not contained in Mr. Turner's list, but recorded in the reports of the Botanical Section of the Yorkshire Naturalists' Union for 1877 and 1878, and the additional list sent by me to the *Naturalist* last November, the following may be placed on record:—

Chætophora tuberculosa, Ag. York, T. Hick, W. West; Baildon, W. West.

Pleurocarpus mirabilis, A. Br. (*Mougeotia genuflexa*, Ag. et Auct.) Riccall, W. West; Askham, T. Hick, W. West.

Chantransia Hermannii, Roth. Baildon, W. West.

Vaucheria cæspitosa, Ag. Markington, J. S. Tute; Arncliffe, W. West; Dent, Messrs. Nuttall, Parsons, and West.

Sirosiphon compactus, Ag. Brant Fell, W. West.

Tolypothrix distorta, Müll. Near Bradford, W. West.

Calothrix mirabilis, Dillw. Malham Tarn, W. West.

Oscillaria rupestris, Ag. Ingleton, H. F. Parsons,

O. limosa, Ag. Baildon, W. West.

Nostoc cæruleum, Lyngb. Baildon, W. West.

Cylindrospermum macrospermum, K. Bradford, J. E. Wilson, W. West.

Gleocystis vesiculosa, Næg. Rawcliffe, W. Nuttall and W. West.

Pleurococcus vulgaris, Menegh. This is the most plentiful alga known (if not consisting of the gonidia of lichens) everywhere, on tree truaks, &c.

Cosmarium botrytis, Bory. Markington, J. S. Tute.

Closterium acerosum, Schr. Do. do.

C. costatum, Cda. Do. do.

P. Boryanum, Turp. Do. do.

Cymbella ventricosa, Ag. Ingleton, H. F. Parsons.

Pinnularia major, Ral. Baildon, W. West.

Bacillaria elongata, Ehrh. Markington, J. S. Tute.

Himantidium pectinale, Kg. Baildon, W. West.

Synedra ulna, Ehrh. Markington, J. S. Tute.

The number of algæ recently recorded for Yorkshire (almost all for the West-Riding) is now 208, and two varieties. Many additional localities to those published are known for many of the species.

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

THE following list of plants found in the two adjoining counties of Anglesea and Carnarvon, although more extensive than might have been expected, comparing their size with any other corresponding area in Great Britain, must nevertheless be looked upon as far from complete.

Owing to the insular position of Anglesea and the peninsular configuration of Carnarvonshire, both counties abound in algæ and in the flora peculiar to maritime shores. The former county contains many stretches of marsh and moor land, producing aquatic, sub-aquatic, and bog plants in abundance. The latter county, owing to its mountainous character and the constant humidity of its atmosphere, is rich in alpine plants, while every boulder, stone, crag, ancient ruin and wall is covered with mosses and lichens in profuse

luxuriance. Upwards of thirty lakes, great and small, nestle in the valleys and cwms of Carnarvonshire. Many of them are at a considerable elevation, and a careful examination of them will well repay the botanist in search of alp-lacustrine plants.

(A) means Anglesea, (C) Carnarvonshire.

RANUNCULACEÆ.

Clematis Vitalba, L. (A) Hedges Ty Mawr, Llangefni, &c.; (C) near Penchwintan, Bangor, &c.

Thalictrum alpinum, L. (C) Between Twll du and Llanberis.

T. minus, L. (A) Frequent on rocks along the coast; (C) Twll du, Great Ormshead, &c.

T. flavum, L. (A) Between Pentraeth and Red Wharf; (C) On the roadside between Bethesda and Ogwen Lake, &c.

Anemone nemorosa, L. Common in and near woods in both counties.

Ranunculus aquatilis, L. Common in ponds and ditches in both counties.

R. hederaceus, L. Common in both counties.

R. Lingua, L. (C) Cors ddygai, &c.

R. Flammula, L. Frequent in both counties.

R. Ficaria, L. Abundant in both counties.

R. sceleratus, L. Under Tre Castell, Beaumaris, and on the beach under Wern, Llanddona.

R. auricomus, L. (A) Baron Hill woods.

R. acris, L. Abundant in both counties.

R. repens, L. Common in both counties.

R. bulbosus, L. Frequent in both counties.

R. philonotis, Ehrh. (C) Port Penrhyn, Bangor.

R. parviflorus, L. (A) Towyn Capel, near Holyhead; (C) Near Bangor and Conway.

Caltha palustris, L. Abundant in both counties.

Trollius europæus, L. Along the banks of Ogwen river, Twll du, &c.

Helleborus foetidus, L. (C) Tan yr Allt Woods, Bangor.

Aquilegia vulgaris, L. (A) Near Arthur's Round Table; (C) On the banks of Menai Straits, between Bangor and George Hotel, &c.

NYMPHÆACEÆ.

Nymphaea alba, L. Common in ponds and ditches in both counties.

Nuphar lutea, Sm. Common in both counties.

PAPAVERACEÆ.

- Papaver Rhœas*, L. Abundant in cornfields in both counties.
P. dubium, L. (C) Great Ormshead, &c.
P. hybridum, L. Do.
P. Argemone, L. (A) Near Llanfaelog; (C) Near Llandudno Junction.
Meconopsis cambrica, Vig. (C) Along the banks of Ogwen river, Twll du, &c.
Chelidonium majus, L. Frequent in both counties.
Glaucium luteum, Scop. Common in many places on the coast of both counties.

FUMARIACEÆ.

- Fumaria officinalis*, L. Abundant in both counties.

CRUCIFERÆ.

- Matthiola sinuata*, Br. (A) Between Abermenai and Llanddwyn.
Cheiranthus Cheiri, L. Common on walls and old buildings in both counties.
Barbarea vulgaris, Br. (A) Cadnant, &c.; (C) Near Old Baths, Bangor, &c.
Nasturtium officinale, Br. Abundant in both counties.
N. palustre, D. C. (A) Cors ddygai and near Beaumaris.
Arabis hirsuta, Br. (A) On rocks, Porthamel, &c.; (C) Great Ormshead, &c.
A. thaliana, L. (A) Frequent on old walls, banks, &c.; (C) Common about Bangor, &c.
A. petræa, Lam. (C) On Snowdon, rare.
Cardamine hirsuta, L. Abundant in both counties.
C. pratensis, L. do. do.
Sisymbrium officinale, Scop. do. do.
S. Sophia. (A) Near Llanfaes.
Alliaria officinalis, D.C. Common in both counties.
Brassica tenuifolia, Boiss. I have never seen this plant growing in A. or C., but it is very plentiful on Chester town walls.
B. muralis, Boiss. (C) Port Penrhyn, Bangor.
B. monensis, Huds. Port Penrhyn, Bangor, &c.
B. oleracea, L. (A) S.W. coast sparingly; (C) Great Ormshead and Little Ormshead plentifully.

- B. Napus*, L. Common in cornfields in both counties.
- B. sinapistrum*, Boiss. Common in waste places in both counties.
- B. nigra*, Boiss. (A) Llandysilio and Beaumaris; (C) Great Ormshead, &c.
- Cochlearia armoracia*, L. (A) Near Garth Ferry; (C) Great Ormshead, &c.
- C. officinalis*, L. Frequent in both counties.
- C. anglica*, L. Common in many places in both counties.
- C. danica*, L. (A) Malltraeth, Llanddwyn; (C) Bangor and between Aber and Llanfairfechan.
- Alyssum maritimum*, L. (A) Menai Bridge; (C) About Bangor, &c.
- Draba incana*, L. (C) Snowdon and near Twll du.
- D. verna*, L. Abundant in both counties.
- Subularia aquatica*. (A) On the border of Coron Lake, &c.; (C) On the border of Idwal Lake, &c.
- Thlaspi alpestre*, L. (C) Between Llanrwst and Trefriw, on road side.
- Teesdalia nudicaulis*, Br. (A) Towyn Aberffraw.
- Iberis amara*, L. (A) On the beach at Penmon.
- Hutchinsia petræa*, Br. (C) Great Ormshead, between Happy Valley and St. Tudno's Church, &c.
- Capsella Bursa-pastoris*, D.C. Abundant in both counties.
- Lepidium Smithii*, Hook. do. do.
- L. latifolium*, L. (A) Near Aberffraw.
- L. rudérale*. (C) Port Penrhyn, Bangor.
- Senebiera didyma*, Pers. (C) Abundant on Port Penrhyn, Bangor.
- S. coronopus*. (C) On the quay, Carnarvon.
- Cakile maritima*, Scop. (A) Towyn Capel, near Holyhead.
- Crambe maritima*, L. (A) Cemlyn Bay, plentifully.
- Raphanus Rraphanistrnm*, L. (A) Near Beaumaris.

RESEDACEÆ.

- Reseda lutea*, L. (C) Felyn hen, near Bangor.
- R. luteola*, L. Common in both counties.

CISTACEÆ.

- Helianthum guttatum*, Mill. (A) Gader Llanfairynghornwy, s.w. side, between an old limekiln and the sea; also Holyhead mountain near Southstack, with *Helianthemum Breweri*. I may here add,

that about the middle of June is the best time to find it, also that the botanist must try to get it in the morning, as the petals all drop off before 3 p.m. The flower only lasts about six hours.

- H. Breweri*. (A) Near Southstack, Holyhead mountain. The same note may be applied to this as to the above. This plant has narrower leaves, and is much more stunted than the preceding one.
- H. canum*, Duval. (A) About Arthur's Round Table, &c.; (C) Abundant on Great Ormshead.
- H. vulgare*, Gaert. Abundant in both counties.

VIOLACEÆ.

- Viola palustris*, L. (A) Cors ddygai, &c.; (C) Near Moelyci, Bangor, &c.
- V. odorata*, L. (A) Near Marquis' Column; (C) Maes y gerchan, Bangor.
- V. hirta*, L. (A) Near Arthur's Round Table, &c.; (C) Great Ormshead.
- V. canina*, L. Abundant in both counties.
- V. tricolor*, L. Common in both counties.
- V. Curtisii*, Foster. (A) On the sands near Coron Lake, also Maelog sands, &c.
- V. arvensis*. Common in both counties.
- V. lutea*, Huds. (A) Near Llanddwyn.

POLYGALACEÆ.

- Polygala vulgaris*, L. Abundant in both counties.

CARYOPHYLLACEÆ.

- Dianthus deltoides*, L. (C) Deganwy rocks, near Conway. Flowers in July.
- D. cæsius*, L. (C) Conway Town walls. Flowers in July.
- Saponaria officinalis*, L. (A) Near Bodorgan Station; (C) Bangor (alien).
- Silene acaulis*, L. (C) Twll du, Ysgolion duon, &c.
- S. inflata*, Sm. Abundant in both counties.
- S. maritima*, With. (A) Along the coast, frequent; (C) Bangor, Great Ormshead.
- S. nutans*, L. (C) Abundant on Great Ormshead.
- Lychnis vespertina*, Sibth. Abundant in both counties.
- L. diurna*, Sibth. Do. do.

- L. Githago*, Lam. Frequent in cornfields in both counties.
- L. Flos-cuculi*, L. Abundant in marshy places in both counties.
- Sagina procumbens*, L. Abundant in both counties.
- S. nodosa*, Meyer. Frequent in both counties.
- Arenaria verna*, L. (C) Great Ormshead.
- A. peploides*, L. (A) Frequent along the coast: Friars, Beaumaris, &c.; (C) between Bangor and Llanfairfechan, on the beach, &c.
- A. serpyllifolia*, L. Common in both counties.
- A. tenuifolia*, L. (A) On rocks near Boduon, Bodorgan.
- A. trinervis*, L. (A) Frequent; (C) Garth Hills, Bangor, &c.
- Cerastium tetrandrum*, Curt. Towyn, Aberffraw.
- C. vulgatum*, L. Abundant in both counties.
- C. glomeratum*, Thuil. Common in both counties.
- C. viscosum*. Frequent in both counties.
- C. semidecandrum*, L. Do.
- C. alpinum*, L. (C) Snowdon, Carnedd Llewelyn.
- C. latifolium*, Sm. (C) Snowdon.
- Stellaria media*, L. Abundant in both counties.
- S. uliginosa*, Murr. Common in both counties.
- S. graminea*, With. Abundant in both counties.
- S. glauca*. With. Frequent in both counties.
- S. Holostea*, L. Do. do.
- Spergularia rubra*, Fenzl. Do. do.
- S. rupestris*, Lebel. (A) Breakwater, Holyhead; (C) on rocks near Cricceth.
- S. marginata*, Syme. (C) Under Deganwy Castle, near the beach.
- Spergula arvensis*, L. Abundant in both counties.

PORTULACACEÆ.

- Montia fontana*, L. Common in both counties.

ELATINACEÆ.

- Elatine hexandria*, D.C. (A) Coron Lake, Maelog Lake.
- E. Hydropiper*, L. South end of Coron Lake, near an old cottage; also east end. Flowers in August.

HYPERICACEÆ.

- Hypericum Androsœmum*. L. (A) Near Beaumaris; (C) between the Baths and Gorad Gyt, Bangor, &c.

- H. perforatum*, L. Abundant in both counties.
H. dubium, Leers. To be found occasionally in both counties.
H. quadrangulum, L. Frequent in both counties.
H. pulchrum, L. (A) Rhoscolyn, &c.; (C) between Gorad Gyt and George Hotel, Bangor, &c.
H. montanum, L. (A) Penmon, Arthur's Round Table, &c.; (C) Twll du, Great Ormshead, &c.
H. elodes, L. Frequent in both counties.

LINACEÆ.

- Radiola millegrana*, Sm. (C) On the common near the railway, Carnarvon.
Linum usitatissimum, L. Frequent in cornfields in both counties.
L. catharticum, L. Abundant in both counties.

MALVACEÆ.

- Lavatera arborea*, L. (A) Garth Ferry, Beaumaris, and near Holyhead; (C) Great Ormshead, &c.
Malva rotundifolia, L. (A) Between Gallows Point and Beaumaris, &c.; (C) Great Ormshead, &c.
M. sylvestris, L. Abundant in both counties.
M. moschata, L. Frequent in both counties.

(To be continued.)

Short Notes and Queries.

Fissidens serrulatus, BRID., IN ENGLAND.—I beg to announce the discovery of the above moss as a native of Britain. The plant seems to have been distributed by Mr. Curnow for some years back, under the name of *F. polyphyllus*. I understand that Mr. Boswell first found out the mistake from specimens gathered by Mr. Curnow, last November, but my specimens were gathered so far back as September, near Penzance.—JOHN WHITEHEAD.

LARGE ASSEMBLY OF MAGPIES.—During a walk to Adel on the 3rd inst. my brothers, while passing the house of Mr. Tetley at Meanwood, were surprised by a loud chattering noise, which, when they got nearer, they found to proceed from a great number of magpies assembled together. Within a very short space they counted twenty-eight, and there were many more perched on the trees, walls, and fences. Without exaggerating they say there must have been upwards of fifty, and several persons were watching them. Can anyone inform me what had attracted them, and if it is not an unusual occurrence? I have never seen more than two or three together. It seemed as if all the magpies in the neighbourhood of Leeds had met together to form plans for the new year.—WALTER RAINE, Leeds. Jan. 6th.

LOCAL NAMES OF FISHES.—Mr. Thomas Satchell, of Downshire Hill House, Hampstead, London, N.W., is compiling a glossary of fish names, a provisional index to which has been printed and distributed for the purpose of obtaining additions and corrections. He not only wishes to record the local names of fishes, and the districts where used, but also the local designations of marine animals and fishing appliances, fishing terms generally, and notes on popular beliefs and superstitions connected with fish and fishing. The glossary will ultimately be printed by the English Dialect Society. Mr. Satchell will be glad to receive assistance from any who will forward him notes from any locality. It would also be useful to readers of the *Naturalist* to record their notes in its pages.—WM. DENISON ROEBUCK, Leeds, Feb. 10th.

HOW TO MOUNT MOSSES.—Could any bryologist give a short account as to the best mode of mounting and preserving mosses for the herbarium, other than those given by Dr. Braithwaite in "Notes on Collecting and Preserving Natural History Objects"?—J. R. M.—[See *Naturalist*, vol. iv., p. 56.—EDS.]

Rainfall for January.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 0·24	5	0·24	* 3·08	1	0·13
† LEEDS ... (H. Crowther) ...	183	0·53	4	0·53	1·32	17	0·01
HALIFAX ... (F. G. S. Rawson)	360	0·49	2	0·49	1·30	...	...
BARNLEY ... (T. Lister) ...	350	0·20	5	0·20	1·08	16	0·07
INGBIRCHWORTH (do.)	853	0·21	9	0·21	1·19	1	0·07
WENTWORTH CASTLE (do.)...	520	0·18	5	0·18	1·39	15	0·06
GOOLE ...	25	0·20	2	0·20	1·06	15	0·15

* This is the average to date for 13 years, 1866-78.

† Leeds Rainfall for Jan.	1880	1879	1878	1877	1876	1875	1874	1873
	·053	1·320	2·500	3·760	0·605	3·511	1·544	2·367

Reports of Societies.

BARNLEY NATURALISTS' SOCIETY.—Meeting, 17th February.—A very interesting paper on rare migrating birds was read by Mr. G. Rose. The entomological and botanical sections meet regularly, and in the absence of observed specimens, good papers are read by members. The ornithological report treats of similar movements of water-fowl and land-birds as recorded in the last number of the *Naturalist*. Jan. 8th, Mr. H. Garland,

of Woodhall, reports the great grey gull, kestrel, fieldfares, and thrush, all rarely seen this winter until the breaking up of the first and second frost. Jan. 11th, Mr. W. Talbot, of Wakefield, reports the occurrence of the great-crested grebe, red-throated diver (immature), and little grebe, on pools and streams between that town and Barnsley; with rare birds as well as plants, locality not always given, so as to give less temptation to extirpate them. Jan. 24th, Mr. Hailstone reports that flocks of twenty or more of Canadian geese came from Nostell. He was disturbed recently by alarm cries of the waterfowl from the island on which Walton Hall is built, and on approaching he found a mallard caught by its beak in a rat trap which it had dragged upon the ice. When rescued, the other birds became quiet. It seems to him and to us something like reasoning intelligence. A friend reports examining, in a bird-shop at Doncaster, a rough-legged buzzard, and a weasel, partly decomposed, which it had swallowed recently. Mr. Kell reports the little grebe in a pool near Silkstone. Feb. 19th, chaffinches singing joyously at the Limes, near Barnsley.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 6th.—The president delivered his inaugural address from the chair, reviewing briefly the present position of the society and its objects, and throwing out some valuable hints regarding future operations. He suggested the formation of collections of objects of natural history, for the use of the society, and strongly recommended members to take up the investigation of some of the more obscure orders of the animal and vegetable kingdoms. Mr. West gave the first of a valuable series of demonstrations of the characters of the natural orders of British plants, dealing with the orders Ranunculaceæ, Berberidaceæ, Nymphæaceæ, Papaveraceæ, Fumariaceæ, and Cruciferae.

MEETING, Jan. 20th, the president in the chair.—Mr. J. A. Douglas, F.R.M.S., read an interesting paper on "Flame."

MEETING, Feb. 3rd, the president in the chair.—Mr. H. T. Soppitt read a paper on "Fungi," describing their structure and classification, and showing the distance these organisms are from flowering plants. He described their method of reproduction and growth, illustrated by black-board diagrams and coloured charts of many macro-fungi, both edible and poisonous. A number of slides of minute fungi were exhibited under the microscope to illustrate the remarks on the micro-fungi.—J. W. CARTER, Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Meeting Feb. 2nd.—The president, Mr. C. C. Hanson, gave his inaugural address. Mr. J. E. Garside exhibited a merlin. The Saturday afternoon rambles were fixed for the coming season. On Jan. 15th Mr. John Lumb, of Greetland, shot a beautiful adult male specimen of the long-eared owl in North Dean Wood—a very rare occurrence.—W. H. STOTT, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting Feb. 13th, Mr. S. L. Mosley, president, in the chair.—Mr. C. P. Hobkirk exhibited an extensive series of mosses, gathered by Mr. T. W. N. Beckett, F.L.S., and Mr. Thwaites, in Ceylon : amongst them were two species also found in Britain—*Hypnum Swartzii* and *H. plumosum* ; the others included many beautiful forms, as *Hypnodendron arborescens*, *Trachypus crispatus*, *Neckera flabellata*, *Macromitrium Schmidii* (fr.), *M. hispidulum*, *M. fasciculare* (fr.), &c. The president showed a box of ichneumonidæ, received that day from Mr. G. C. Bignell of Plymouth, including *Limneria albidus* bred from the larvæ of *Gonepteryx rhamni*, *Anomalon xanthopus* from *Pieris Daphidice*, *Apanteles oveolarum* from *Melitæa Artemis*, and *Apanteles glomeratus* from *Pieris brassicæ*. Mr. G. T. Porritt showed a series of *Pterophorus spilodactylus*, from Freshwater in the Isle of Wight ; they were much darker in colour than some he exhibited about a year ago from another locality. Mr. S. D. Bairstow, a box of coleoptera, orthoptera, and diptera, including some beautiful exotic species. The chairman then gave the inaugural address for the year, on “The Uses of Provincial Natural History Societies.”

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Annual meeting, Liverpool, the president, Mr. S. J. Capper, in the chair.—The retiring officers were re-elected for the current year. The balance sheet for the past year was adopted. The following exhibits were made :—Beech leaves mined by the larvæ of *Lithocolletes faginella*, by Mr. J. L. Ellis ; a case of specimens of *Ornithoptera arvana* from New Guinea, by Mr. T. J. Moore.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—365th meeting, Jan. 27th.—The new president, Mr. Benjamin Holgate, F.G.S., gave his inaugural address, in which he showed the mutual interdependence of the various sciences, and the consequent desirability of mutual association on the part of scientific students. At the close of his address he explained the boundaries of five districts which have been adopted as a basis for writing lists of fauna and flora, and the principles on which the districts were framed. Short notes were read : I. on “The Badger in Yorkshire,” by Mr. Richard Andrews ; II. on “The earliest known Yorkshire Plant, the Yew,” by Mr. F. Arnold Lees, F.L.S.

336TH MEETING, Feb. 3rd, the president in the chair.—Mr. Henry Lupton, president of the Entomological Section, opened its proceedings by a short paper on his entomological visit to Brazil, which he illustrated by a collection of the butterflies.—W. D. R.

367TH MEETING, Feb. 10th, Mr. B. Holgate, F.G.S., president, in the chair.—The subject of the evening was “Parasites and Parasitism,” upon which Mr. Washington Teasdale, F.R.M.S., delivered an address, illustrated by a fine series of photographs by Dr. Maddox. He also showed the curious edition of Hooke’s “*Micrographia Restaurata*” (1745). He exhibited the parasites of the flying fox (*Nycteribia*), of muscular tissue (*Trichina spiralis*), of man (*Pediculus pubis* and eggs, and *Tænia solium*),

fowl (eggs of *Menopon pallidum*), horse (eggs of bot-fly), sheep (fluke, *Fasciola hepatica*), humble-bee (*Gammasus bomborum*), fish (*Argulus foliaceus*), and stickleback (*Pandarus bicolor*). Mr. F. Emsley showed the parasites of stickleback (*Argulus foliaceus*) and beetle (*Gammasus coleoptratorum*). Mr. W. H. Kirtlan exhibited the squirrel flea (*Pulex sciuri*). Mr. W. Barwell Turner, F.C.S., F.R.M.S., parasites of the sheep (*Melophagus ovinus*), man (*Pulex irritans* and *Cimex lectularius*) cat (*Pulex felis*), beetle, bee, and tortoise; he also showed the following anoplura:—*Pediculus capitis* (man), *Colpocephalum nyctarde* (night heron), *C. ochraceum* (dunlin and woodcock), *Menopon pallidum* (fowl), *M. icterum* (woodcock), *Docophorus lari* (herring gull), *D. bassani* (gannet), *D. cursor* (short-eared owl), *D. variabilis* (dunlin), *D. cephalus* (pomarine skua), *Trinoton conspurcatus* (goose), *Nirmus fulica* (coot), *N. obscurus* (dunlin), *N. sellatus* (herring gull), *N. fuscus* (hen harrier), *Goniodes dispar* (partridge), and *Haematopinus suis* (pig), also peculiar specimens of anoplura from the gray plover, tern, and pomarine skua. Miscellaneous exhibits and communications were made by Mr. J. W. Dixon and other members.

368TH MEETING, Feb. 17th, Mr. Henry Lupton, V.P., in the chair.—Short notes from Mr. Alfred Roberts, of Scarborough, were read, the subjects being—the fondness of animals (chimpanzee) for scent; the nesting of the kingfisher; the habits of the common bat; and an anecdote of a snake carrying off a starling's egg. Mr. John Grassham exhibited a male golden-eye duck in full adult plumage, in which state it is but rarely met with; Mr. Walter Raine, eggs of the ostrich, emu, and great bustard. Microscopic objects were shown by Mr. F. Emsley, and an external parasite (unnamed) of the pig by Mr. Benjamin Saynor. Mr. Washington Teasdale, F.R.M.S., showed a number of iridescent diatoms from China, and various seeds and pollen grains. Mr. J. R. Murdoch brought a number of diatoms from Calverley, and a variety of mosses and hepaticæ, including *Lepidozia reptans*, *Hypnum Schreberi*, *H. splendens*, *H. squarrosum*, *Sphagnum cymbifolium*, *Rubellum acutifolium*.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting.—The president (Mr. Whitehead) exhibited a specimen of *Coscinodon cribrosus*, which the Rev. J. Fergusson, in a recent number of the *Naturalist*, describes as an immensely interesting addition to the British flora. The moss was collected so long ago as the year 1867, at Coniston, by Professor Barker, of Owen's College, but lay unrecognised until Mr. Fergusson quite recently detected it among a collection of British Grimmiæ which the professor sent him. The president also exhibited a species of *Fissidens* new to Britain, viz., *F. serrulatus*, gathered by Mr. Curnow near Penzance. It was distributed by Mr. Curnow in 1872, mixed with *F. polyphyllus*, and appears to have been mistaken for that species, from which, however, it is quite distinct. A specimen of *Mnium spinosum*, for which Ben Lawers is the only known British station, was exhibited; as were also *Plagiothecium annotinum*, and the various species of *Timmia*,

British and continental, of which only four are at present known. One of the species, *T. Norvegica*, was from Ben Lawers, where, as stated in Schimper's Synopsis, it was first collected by M'Kinlay. A collection of fresh-gathered mosses from Malham and the neighbourhood, exhibited by Mr. Cunliffe, were a source of much interest. The species included *Zygodon Nowellii*, *Omalia trichomanoides*, and *Anomodon viticulosus*—the two latter with fruit. Mr. W. H. Pearson exhibited specimens of *Diplophyllum obtusifolium* (Hook), detected amongst other hepaticæ collected by Mr. C. J. Wild, at Alderley Edge, in May, 1878. It had previously been collected near the Manchester district, at Delamere, by the late Mr. W. Wilson and Dr. Carrington. Mr. Pearson also exhibited specimens of *Metzgeria hamata* (Lindb.), collected by Mr. E. George, of London, last July, near Arrochar, Scotland.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, Feb. 4th, the president, J. Wainwright, F.L.S., in the chair.—The president read a paper founded on minutes he had made during his journey through Spain and Northern Africa in September, October, November, and December last. He confined his remarks more particularly to the botanical portion of his notes, and gave an interesting account of the raisin and almond growth and wine manufacture in the Malaga district, as also of the orange district through which he passed.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Jan. 14th, the president, Mr. T. Harrison, in the chair.—Mr. Bacon exhibited eggs of the spotted eagle (*Falco naevius*) and white-tailed eagle (*Falco albicilla*). The president, a fine collection of birds of prey and others, amongst them being the following species :—*Falco fulvus* (golden eagle), *F. peregrinus* (peregrine falcon), *F. naevius* (spotted eagle), *F. Islandicus* (Iceland falcon), *F. albicilla* (white-tailed eagle), *F. apivorus* (honey buzzard), *F. lagopus* (rough-legged buzzard), *F. buteo* (common buzzard), *Otis tetrax* (little bustard), *Ardea purpurea* (purple heron), *A. stellaris* (bittern), *Anas histrionica* (harlequin duck), *A. glacialis* (long-tailed duck), *Streptilas collaris* (turnstone), &c. ; also the following eggs, taken by himself in Holland during the month of May last year :—nest and eggs of golden oriole (*Oriolus galbula*), melodious willow wren (*Sylvia hypolaïs*), great grey shrike (*Lanius excubitor*), red-backed shrike (*L. colurio*), spotted crane (*Gallinula porzana*), water rail (*Rallus aquaticus*), pintail duck (*Anas acuta*), tufted duck (*A. fuligula*), teal duck (*Crecca*), Gargany duck (*Querquedula*), and the black tern (*Sterna nigra*), also eggs of the lesser tern (*S. minuta*), taken by him at Spurn Point. The hon. secretary, Mr. Prest, a pair of the very rare *Ennomos autumnaria*, taken last year by Mr. Heath near Gosport. This species is one of our rarest insects. Also three specimens of *Boarmia roboraria*, taken last July at Bishop's Wood, near Selby, by Mr. Foster, of Selby. Mr. M. Smith, specimens of *Atomaria fimetarii* and *Rhigophagus parallelcolis*, taken in the York cemetery grounds on fungus, the former one being very rare.

Diary.—Meetings of Societies.

- Mar. 2. Leeds Naturalists' Club, &c.
 „ 2. Liversedge Naturalists'. Bishop Auckland Naturalists'.
 „ 2. Bradford Naturalists': Paper on "Scale Mosses," by Mr. Faull.
 „ 3. Wakefield Naturalists'.
 „ Bradford Scientific Association: Paper by Thomas Tate, F.G.S.
 „ 4. Selby Naturalists': Lecture on "Beetles," by Henry Crowther, of the Leeds Museum.
 „ 5. Goole Scientific Society.
 „ 9. Leeds Naturalists' Club: Lecture by Fredk. Greenwood, M.R.C.S.E.
 „ 10. York and District Field Naturalists'.
 „ 10. Gilchrist Lecture in Armoury, Huddersfield, by Prof. Williamson, F.R.S., &c., Pres. Yorkshire Naturalists' Union.
 „ 11. Bradford Scientific Association: Paper by J. T. Beer, F.R.A.S.
 „ 12. Huddersfield Scientific Club.
 „ 15. Manchester Cryptogamic.
 „ 16. Leeds Naturalists' Club, &c.
 „ 16. Bradford Naturalists': Paper on "Lichens," by Wm. West.
 „ 18. Bradford Scientific Association: Paper by Alfred Crebbin.
 „ 18. Selby Naturalists': Paper on "Fossil Plants," by G. Dent, F.G.S.
 „ 18. Dewsbury Naturalists'.
 „ 18. North Staffordshire Naturalists' Field Club.—Annual Meeting at Stoke.
 „ 23. Leeds Naturalists' Club, &c.
 „ 24. Gilchrist Lecture in Armoury, Huddersfield, by Prof. Duncan, F.R.S., late Pres. Geological Society, of London.
 „ 29. Lancashire and Cheshire Entomological.
 „ 29. Goole Scientific Society.
 „ 30. Leeds Naturalists' Club, &c., General Conversational Meeting.
 „ 30. Bradford Naturalists': Paper on "Effect of Climate on Animal and Vegetable Life," by Wm. Jagger.
 „ 29. (Easter Monday).—Yorkshire Naturalists' Union.—Excursion to Masham and Ripon.

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APRIL, 1880.

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Original Articles.

FISSIDENS SERRULATUS.

BY H. BOSWELL.

BRYOLOGICAL readers of the *Naturalist* who may happen to visit the western coasts should keep a look-out for this handsome moss, lately found for the first time in Britain by Mr. Curnow. It is not impossible that it may grow by the side of some rocky stream between Carmarthenshire and the Hebrides, or in the south and west parts of Ireland. Long supposed a native only of Madeira and the neighbouring islands, it was subsequently found in Portugal, and is one of a few mosses of sub-tropical character and affinities, whose presence with us is doubtless due to the influence of the Gulf stream; such are *Ulotia calvescens*, *Daltonia splachnoides*, *Hookeria luteo-virens*, *Myurium Hebridarum*, &c.; and where they grow, *F. serrulatus* may also occur if fitting habitat be found.

Mr. Curnow has occasionally, during the last twenty years, sent me specimens of *F. polyphyllus*, and during last November sent me two more, of somewhat different aspect, together with a third plant which he thought seemed different from either; and so it was, and from any that he had forwarded before, nor had I much hesitation in coming to the conclusion that it was unmistakeably *P. serrulatus*—a very interesting addition to our British flora.

There is sufficient resemblance between the two to make it very possible to pass over *F. serrulatus* as *polyphyllus*, unless the attention is awake; yet there is plenty of difference between them when closely examined. In *F. polyphyllus* the leaves taper gradually to a point; they are without border, entire except at the apex, which is serrulate; the cells at the basal part are gradually enlarged from the margin inwards towards the nerve, those of the long-decurrent angles being linear-oblong, thin and hyaline; the male flowers are eight or nine-leaved. In *F. serrulatus* the leaves are not tapering, but straight in outline and obtuse-pointed, the margins of the conduplicate portion finely serrulate, the apex of the lamina serrated, and they are furnished with an evident border of yellowish-coloured cells, somewhat larger than the rest; while the basal cells are uniform, and the male flowers three-leaved.

When the "Bryologia Britannica" was published, little was known of this species and its allies: and Wilson, with a commendable desire to avoid the needless multiplication of species, united his *polyphyllus* with

F. asplenoides Swartz, and *F. serrulatus* Brid.; but further study and increased means of knowledge soon showed this to be a mistake. *F. serrulatus* and *polyphyllus* are distinct enough, as shown above, though similar in size and general aspect. *F. asplenoides* seems to be altogether a different plant, and much smaller, more resembling in size *F. crassipes* or *bryoides*, so far as shown by the few specimens I have seen. It is only known, I believe, from South America and New Zealand.

In fact the whole group is a very difficult one to the student, and has been the cause of numerous mistakes, which are perhaps not yet all cleared up.

F. serrulatus, Hornsh. in Flor. Bras. is not the true *serrulatus*, but a much smaller moss, in style like *asplenoides*, and is *F. Hornschuchii* of Montagne. More nearly resembling our plant in size and aspect are *F. sylvaticus*, Griff. (which is *F. Javanicus* of Dozy and Molk. Bryol. Javan.) from India and Java; *F. nobilis*, Griff. (*filicinus*, Dozy and Molk.) from the same countries, and *F. polypodioides*, Hedw., an American species, but none rivals our *polyphyllus* in size. *F. Welwitschii*, Duby, a south-west African species, has lately been reported from Portugal, but the identity is doubtful, and according to Sauerbeck the Iberian plant is a distinct one, *F. polyphylloides*. Judged by the few imperfect specimens I possess, it seems to differ but very little from *polyphyllus*.

Oxford, 20th Feb., 1880.

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

By J. E. GRIFFITH, F.L.S., F.R.A.S.

TILIACEÆ.

Tilia europæa, L. Common in woods in both counties.

GERANIACEÆ.

Geranium sanguineum, L. (A) Grows along the coast in great abundance; (C) Great Ormshead, &c.

G. pratense, L. (A) Near Beaumaris.

G. pyrenaicum, L. (C) Llandudno and Little Ormshead.

G. Robertianum, L. Abundant in both counties.

G. lucidum, L. Common in both counties.

G. molle, L. Abundant in both counties.

G. dissectum, L. Common in both counties.

G. Columbinum, L. (A) Near Llanidan; (C) about Bangor and Aber, plentifully.

Erodium cicutarium, Herit. Abundant round the coast of both counties.

E. moschatum, Herit. (A) Near Holyhead; (C) Llandudno.

E. maritimum, Sm. (A) About Penmon; (C) Great Ormshead, abundantly.

Oxalis acetosella, L. Abundant in both counties.

ACERACEÆ.

Acer campestre, L. Frequent in woods in both counties.

A. Pseudo-platanus, L. Common in both counties (alien).

CELASTRACEÆ.

Euonymus europæus, L. (A) Near Prysiorwerth, Cerrigceinwen, &c., (C) Bangor, Perfeddcoed-road, plentifully.

PAPILIONACEÆ.

Ulex europæus, L. Abundant in both counties.

U. Gallii. Do. do.

Genista tinctoria, L. (A) Near Tregayan; (C) Great Ormshead, &c.

G. anglica, L. (A) North end of Coron Lake, &c.; (C) Brynllwyd, near Bangor, &c.

Sarothamnus scoparius, Wimm. Abundant in both counties.

Ononis arvensis, L. Common in both counties.

O. arvensis, var. β *repens*. (A) Towyn, Capel, &c. (C) Llandudno.

O. spinosa, L. (C) Common about Llandudno.

Medicago sativa, L. (C) Llandudno.

M. lupulina, L. Frequent in both counties.

M. maculata, Willd. (A) Between Friars and Penmon, on waste places near the beach; (C) Gogarth, Great Ormshead.

Melilotus officinalis, Willd. (C) Port Penrhyn, Bangor.

Trigonella ornithopodioides, D.C. (A) On the Green, Beaumaris, N.E. side.

Trifolium incarnatum, L. (C) Friddodd Farm, Bangor (alien).

T. arvense, L. (C) Port Penrhyn, Bangor, and Great Ormshead.

T. pratense, L. Abundant in both counties.

T. medium, L. (A) Fferam gorniog, Pentraeth.

T. striatum, L. (A) Beaumaris; (C) on Garth hills, Bangor.

- T. scabrum*, L. (A) Near Aberffraw.
- T. strictum*. (A) About three miles north of Aberffraw, on a wild uncultivated heath.
- T. suffocatum*, L. (A) Beaumaris Green, Beach near Friars, &c.
- T. subterraneum*, L. (A) Near Bwlan Farm, Aberffraw.
- T. fragiferum*, L. (A) Towyn Capel, near Holyhead.
- T. repens*, L. Abundant in both counties.
- T. procumbens*, L. Common in both counties.
- T. minus*, Relhan. Do. do.
- Lotus corniculatus*. L. Abundant in both counties.
- L. major*, Scop. (C) Felyn Esgob road, Bangor, &c.
- Anthyllis vulneraria*, L. Frequent in both counties. I have found it with deep red flowers on Llangwyfan farm, Aberffraw, Anglesea.
- Astragalus glycyphyllos*, L. (C) Near Gloddaeth woods, Llandudno.
- Ornithopus perpusillus*, L. (A) Near Llanrhyddlad Church, &c.; (C) Bangor mountain, &c.
- Vicia hirsuta*, Koch. (A) Between Gallows point and Beaumaris, Holyhead, &c.; (C) near Menai Bridge, &c.
- V. Cracca*, L. Abundant in both counties.
- V. sylvatica*, L. Siliwen, Bangor.
- V. Orobus*, D. C. (C) Near Bettwyscoed.
- V. sepium*, L. Abundant in both counties.
- V. sativa*. Not uncommon in both counties.
- Lathyrus Aphaca*, L. (C) Camaesyglodig, Bangor.
- L. pratensis*, L. Abundant in both counties.
- L. sylvestris*, L. (A) Near Llanidan; (C) Penmaenmawr.
- L. palustris*. (C.) Near Beddgelert, and between Little Ormshead and Llandrillo.
- Orobus tuberosus*, L. Frequent in both counties.

ROSACEÆ.

- Prunus communis*, Huds. Abundant in both counties.
- P. Cerasus*, L. Common in both counties.
- P. Padus*, L. (C) Above Bethesda and Twll du, &c.
- Spiræa Ulmaria*, L. Common in both counties.
- S. Filipendula*, L. (A) Llanbeder Church; (C) Great Ormshead, abundantly.

- Dryas octopetala*, L. (C) Between Twll du and Glyderfawr, Snowdon.
- Geum urbanum*, L. Frequent in both counties.
- G. rivale*, L. (A) Near Bodafon mountain; (C) Twll du, &c.
- Rubus Idæus*, L. Frequent in both counties.
- R. fruticosus*, L. Abundant in both counties.
- R. corylifolius*, Sm. Do. do.
- R. cæsius*. (A) Between Boduon and the sea; (C) Llandudno, &c.
- Rubus saxatilis*, L. (C) Great Ormshead, and near Garth Ferry, Bangor.
- R. Chamæmorus*, L. (C) Near Cricceth.
- Fragaria vesca*, L. Common in both counties.
- Potentilla fragariastrum*, Ehrh. do.
- P. Tormentilla*, Schenk. Abundant in both counties.
- P. verna*, L. (C) Great Ormshead and Gloddaeth.
- P. alpestris*, Hall. (C) Snowdon.
- P. anserina*, L. Abundant in both counties.
- P. reptans*, L. do. do.
- Comarum palustre*. L. (A) Cors ddygai, &c.; (C) Cwrwyrion Lake, &c.
- Alchemilla vulgaris*, L. Frequent in both counties.
- A. arvensis*, Scop. do. do.
- Poterium Sanguisorba*, L. (A) Arthur's Round Table, &c.; (C) Great Ormshead, Bangor, &c.
- Agrimonia Eupatoria*, L. Frequent in both counties.
- Rosa pimpinellifolia*, L. Abundant in both counties.
- R. rubiginosa*, L. (A) On the hills above Menai Bridge.
- R. Caninæ*, L. Abundant in both counties.
- R. arvensis*, L. Frequent in both counties.
- R. Wilsoni*. Near Cae coch, Bangor.
- Pyrus Malus*, L. Frequent in hedges in both counties.
- P. Aria*, Ehrh. (C) Cliffs, Great Ormshead, on a declivity by the Menai, Bangor.
- P. Aucuparia*, Gärt. (A) Frequent in woods; (C) Along the Snowdonian Range, often.
- Cratægeus Oxyacantha*, L. Abundant in both counties.
- Cotoneaster vulgaris*, Lindley. Great Ormshead, near the old copper mines.

(To be continued.)

CONTRIBUTION TO A LIST OF THE DIPTERA OF LANCASHIRE AND CHESHIRE.

(NORTH OF LANCASTER EXCEPTED).

BY BENJN. COOKE.

ASILIDÆ.

- Laphria marginata*.—A pair on the Cheshire coast many years ago.
Asilus cristatus. Common at Southport.
A. forcipatus. Common on the Cheshire coast ; Southport.
A. crabroniformis. Cheshire coast, scarce.
Dasypogon cinctellus. Common at Southport ; Cheshire coast.
Dioctria rufipes. Manchester ; Marple.
D. Baumpaueri. Hazelgrove ; Bowdon.
Leptogaster cylindricus. Delamere forest.

LEPTIDÆ.

- Leptis scolopacea*, *tringaria*, and *lineola*. Each common.
Chrysopila holosericea and *aurea*. Common.
Atherix Ibis. Bowdon.
A. crassicornis. Rivington ; Greenfield.
Ptiolina melæna. One example at Whaley-bridge, June, 1859.
Only just within the district.
Thereva bipunctata. Manchester ; Southport ; Bowdon.
T. cincta. Southport ; St. Anne's ; Cheshire coast.
T. plebeia. Southport ; Cheshire coast ; Bowdon.
T. fuscipennis. Bowdon, June and July, 1875.
T. annulata. Southport ; Cheshire coast ; Bowdon ; Delamere.

EMPIDÆ.

- Empis tessellata*. Common. (*E. borealis* has been recorded from Lancashire ; it belongs rather to the Lake district.)
E. livida. Common.
E. opaca. Manchester ; Bowdon.
E. chioptera. Manchester.
E. pennaria, *vernalis*, *lepidopus*, and *leucoptera*. Manchester.
E. pilipes. Hazelgrove.
E. stercorea and *ignota*. Common.
E. lutea. Marple ; Hazelgrove.
E. femorata. Rivington.
Hilara chorica. Manchester.
H. pilosa. Abundant.

- H. fuscipes*. Cheshire coast.
H. pruinosa. Manchester.
H. quadrivittata. Manchester; Bowdon; Hazelgrove.
H. littorea. Manchester; Bowdon; Stalybridge.
H. tenella. Manchester.
H. nana. Manchester; Hazelgrove.
H. rufipes. Bowdon.
H. obscura. Rivington; Bowdon.
Helcodromia stagnalis. Manchester.
Rhamphomyia nigripes. Manchester, Stretford.
B. sulcata. Abundant.
R. cinerascens. Manchester.
R. cæsia. Manchester, May, 1867.
R. variabilis. Delamere.
R. æthiops. Hazelgrove.
R. flava. Hazelgrove; Bowdon.
Microphorus clavipes. Manchester, August, 1861.
Cyrtoma spuria. Manchester.
Ocydromia glabricula. Manchester, Rivington, Marple.
Hybos vitripennis. Hazelgrove.
H. femoratus. Manchester.
Platypalpus agilis. Manchester.
P. bicolor. Hazelgrove.
P. calceatus and *articulatus*. Common.
P. varius. Rivington; Hazelgrove.
P. fascipes. Manchester; Wilmslow.
P. laticinctus and *ciliaris*. Manchester.
P. luteus. Hazelgrove; Marple.
P. annulatus and *minutus*. Common.
P. dubius. Manchester.
P. longicornis. Manchester; Bowdon.
Drapetis nigra. Cheshire coast.
Tachydromia arrogans. Common.
T. cimicoides and *connexa*. Manchester; Bowdon.
T. nervosa. Bowdon; Delamere.
Hemerodromia præcatoria. Hazelgrove; Bowdon.

DOLICHOPIDÆ.

- Psilopus platypterus*. Manchester; Hazelgrove.
P. Wiedemanni. Bowdon; Southport.
Sybistroma obscurella. Hazelgrove.
Dolichopus fulgidus. Bowdon.

- D. æneus*. Common.
D. brevipennis. Manchester.
D. atripes. Bowdon.
D. vitripennis and *urbanus*. Manchester.
D. plumipes. Rivington; Bowdon; Hazelgrove; Hyde.
D. pennatus. Manchester; Marple; Knutsford.
D. popularis. Bowdon.
D. confusus. Southport, June, 1879.
D. acuticornis. Cheshire coast; Bowdon.
D. simplex. Manchester; Rivington.
D. trivialis and *festivus*. Manchester.
D. griseipennis. Hazelgrove.
D. germanus. Delamere.
D. nigripennis, *cupreus*, *celer* and *ærosus*. Manchester.
Hydrophorus virens. Rivington.
H. notatus. Manchester. Scarce.
H. præcox. Rivington.
Campsicnemus curvipes. Manchester.
C. armatus. Southport.
Rhaphium caliginosum. Bowdon.
R. gravipes. Bowdon.
R. fulvipes. Manchester; Bowdon.
R. commune. Bowdon.
Argyra diaphana. Bowdon; Marple.
A. leucocephala. Manchester; Hazelgrove.
A. argentina. Rivington.
A. vestita. Manchester; Hyde.
Diaphorus obscurellus. Bowdon.
Chrysotus nigripes. Common.
Medeterus jaculus. Manchester; Bowdon.
M. truncorum. Common.

LONCHOPTERIDÆ.

- Lonchoptera lutea* and *lacustris*. Common.
L. flavicauda. Manchester; Hazelgrove.

PLATYPEZIDÆ.

- Platypeza atra*. Bowdon, June, 1862.
P. picta. Manchester, rare.

PIPUNCULIDÆ.

- Pipunculus sylvaticus*. Southport; Cheshire coast.
P. campestris. Manchester.

TABANIDÆ.

- Tabanus austriacus*. Warrington.
Hæmatopota pluvialis. Common.
Chrysops cæcutiens. Bowdon.
C. relictus. Blackpool.

ANTHRACIDÆ.

- Anthrax hottentotta*. Cheshire coast.

BOMBYLIDÆ.

- Bombylius major*. Bowdon.
Phthiria pulicaria. Cheshire coast.

STRATIOMIDÆ.

- Beris clavipes*. Hazelgrove ; Manchester.
B. vallata. Manchester ; Hazelgrove.
B. chalybeata. Manchester ; Rivington ; Hazelgrove ; Bowdon.
B. Morrisi and *geniculata*. Hazelgrove, common but very local.
Stratiomys viridula. Southport, common in some seasons.
Oxycera trilineata. Cheshire coast.
Nemotelus uliginosus. Southport.
Chrysomyia formosa. Manchester ; Southport.
C. polita and *pallipes*. Manchester.
C. cyaneiventris. Hazelgrove ; Whaley Bridge.
Sargus cuprarius. Manchester ; Knutsford.
S. iridatus. Manchester ; Bowdon.
S. bipunctatus. Manchester, scarce.

SYRPHIDÆ.

- Eristalis tenax*. Abundant.
E. æneus. Hazelgrove.
E. sepulcralis. Manchester ; Bowdon.
E. intricarius. Manchester ; Southport ; Bowdon.
E. pertinax. Southport ; Marple.
E. nemorum. Hazelgrove.
E. arbustorum. Abundant.
E. rupium. Rivington, rare.
E. fossarum. Common.
Helophilus pendulus. Abundant.
H. lineatus. Bowdon.
Syritta pipiens. Abundant.
Xylota sylvarum. Bowdon.
X. florum. Hazelgrove ; Bowdon.

- Criorhina oxyacanthæ*. Stretford ; Bowdon.
Volucella pellucens. Bowdon.
Sericomyia borealis and *lappona*. Rivington.
Chrysotoxum festivum. Southport.
C. marginatum. Rivington.
Pipiza notata. Bowdon.
P. lugubris. Hazelgrove.
Chrysogastia cœmeteriorum. Common.
C. viduata and *metallica*. Bowdon.
Rhingia campestris. Common.
Chrysoclamis cuprea. Bowdon.
Cheilosia lucorum. Bowdon ; Marple.
C. œstracea. Rivington ; Hazelgrove.
C. chrysocoma. Delamere.
C. chloris and *variabilis*. Bowdon.
C. intonsa. Manchester ; Southport ; Knutsford.
C. pigra (?). Bowdon.
C. impressa. Bowdon.
C. flavimana. Bowdon ; Hazelgrove.
C. mutabilis. Marple.
C. scutellata and *antiqua*. Bowdon.
C. vernalis (?). Hazelgrove.
Syrphus pyrastris and *ribesii*. Common.
S. bifasciatus. Bowdon.
S. luniger. Common.
S. arcuatus. Delamere.
S. latifasciatus. Manchester.
S. corollæ and *balteatus*. Common.
S. tricinctus. Greenfield ; Knutsford : Delamere.
S. glaucius. Hazelgrove ; Rivington.
S. laternarius. Hazelgrove ; Bowdon.
S. albostrigatus. Manchester ; Hazelgrove ; Bowdon.
S. venustus. Rivington ; Delamere.
S. lunulatus. Greenfield.
S. umbellatarum. Hazelgrove.
S. auricollis. Manchester.
S. cinctellus. Bowdon ; Marple ; Delamere.
Melanostoma mellina. Common.
M. scalaris. Manchester ; Bowdon.
M. quadrimaculata. Rivington.
Platychirus manicatus. Common.

P. clypeatus. Common.

P. scutatus. Manchester.

P. cyaneus. Common.

Pyrophæna granditarsus. Manchester ; Bowdon ; Hazelgrove.

Doros citrofasciatus. Greenfield.

Melithreptus pictus. Manchester.

M. menthastri. Bowdon.

Baccha elongata. Common.

Spegina clunipes. Hazelgrove.

Ascia podagrica. Common.

A. floralis. Bowdon.

P. peltatus. Bowdon.

(To be continued.)

Short Notes and Queries.

Acronycta menyanthidis.—A specimen of this insect—supposed to have been a hermaphrodite—is reported (Nat. V., 78) as being exhibited before the Huddersfield Scientific Club. I, at the time of its being exhibited, expressed doubt as to its hermaphroditism, and Mr. Porritt kindly lent me the specimen, along with *P. flavocincta* reported, for examination and figuring, and the following is my opinion on the

menyanthidis:—*Menyanthidis* seems to be clothed with three kinds of scales, something like the engraving. Figs. 1 and 2 form the ground color of the wing, 1 the grey portion, and 2 the black markings, and Fig. 3 is more prevalent near the base of the fore-wings, which gives the insect the soft downy appearance. On the left fore-wing many of Fig. 1 are wanting, and almost



all Fig. 2. We therefore lose the black markings and the white ground, and the tawny membrane of the wing shows through the scattered (Fig. 3) scales, which gives the insect a rather peculiar appearance. I do not therefore consider that hermaphroditism has anything to do with the variation. The *P. flavocincta* is a beauty, and will be figured in my "Varieties of Brit. Lep." I had a somewhat similar one from Mr. Carter two or three years ago.—S. L. MOSLEY, Primrose Hill, Huddersfield.

NOTE ON ABOVE.—I did not make a microscopic examination of the specimen referred to above, and am, therefore, very glad that Mr. Mosley has done so. I think, however, he has overlooked the most important item in his examination, viz., a comparison of the scales of the two sexes. The fact remains that the left side wings of this specimen are of the exact shade and marking of the female of the species, whilst the right side wings are precisely like those of the male. Mr. Mosley says, "On the left fore wing many of Fig. 1. are wanting, and almost all Fig.

2," &c. The question naturally following is, whether this is not always a characteristic of the female? My opinion, too, was based as much on the antennæ as the wings. There is not very much difference in the sexes in this respect; but those of the male are a little thicker, and in this example the right one seems to me distinctly thicker than the left. The best proof would be in the anal appendages; but the specimen was very dry when sent to me, and would require thoroughly relaxing before a proper examination could be made. I still think the specimen a perfect hermaphrodite.—GEO. T. PORRITT.

BADGER AT BRAMHAM PARK.—A very large badger, wide across the back, and very heavy, was shot at Bramham Park, a week or two since by the keeper of G. L. Fox, Esq. It was at the foot of a tree. I have heard of badgers before in the same neighbourhood.—JOHN EMMET, Boston Spa.

NOTE ON THE COMMON BAT.—Mr. Alfred Roberts, the well known Scarborough naturalist, has recently communicated to the Leeds Naturalists' Club the following note:—He was collecting moths under an apple tree one lovely evening in July many years ago: at the same time there were also a number of bats flying round the tree, chiefly the common or pipistrelle bat, one of which he netted. While he was taking it out of the net it was very fierce, biting and squeaking at everything. On reaching home it was placed in a small box. Next morning he was examining the specimen and to his astonishment found it had a young one attached to its breast *fixed* with its tiny hooks. So Mr. Roberts concluded that the female feeds her young whilst flying. He let it remain in the box till evening, when on lifting the lid it instantly flew away with its young.

MAGPIES.—It is not at all uncommon for magpies to congregate in considerable numbers. In the district around Halifax these birds are abundant, and it is not unusual to see a dozen or more together, and upwards of thirty have been seen at once.—F. G. S. RAWSON.

ARRIVAL OF CHIFFCHAFF.—On Sunday, March 21st, I saw, and heard, three chiffchaffs at Spurn.—WM. EAGLE CLARKE, 5, East View, Hyde Park, Leeds.

SNAKE AND EGG.—Mr. Alfred Roberts, of Scarborough, recently communicated a note to the Leeds Naturalists' Club, as under:—In the summer of 1868 a young gentleman from Oliver's Mount School brought an egg to him to be named. He told Mr. Roberts that he had taken it from an adder on the South Cliff whilst it was carrying it to a hole. The egg, which was slightly crushed when brought to Mr. Roberts, was pronounced by him to be that of a starling. Most likely a starling would be nesting in the cliff near.

Chrysomela fulgida, L.—On p. 10 of Vol. IV. of the *Naturalist*, August, 1878, Mr. E. B. Wrigglesworth inquires if this species has ever been

captured in or recorded for the West Riding. The query does not seem to have been answered. In reply I may quote the records I have seen. The first is given in the appendix to Whitaker's "*Loidis and Elmete*," (1816) p. 63, thus:—*Chrysomela fulgida*, *viridi-enea*, *elytris punctatis*, *auro nitidulis*. Fab. Syst. Elent., 1, 43, 59. Habitat *Salice*. Cap. prope Selby, 1806.—Mr. P. W. Watson." The next record dates in 1831, and is thus given in Stephens' Illustrations of British Entomology, vol. iv., p. 345: "Very common on tansey, near York."—W. C. Hewitson. The same author, in 1839, in his Manual of British Beetles, gives it as occurring "on tansy, Yorkshire." In 1840, H. Baines published his Flora of Yorkshire, in which, at p. 59, he gives the tansy as growing on the "banks of the Ouse, above and below York, abundant;" and adds, "It likewise affords nourishment to the larva and perfect insect of *Chrysomela fulgida*. This splendid insect may be found on the tansy, on the banks of the Ouse, in great abundance." Lastly, in the *Entomologist* for August, 1873, vi. 460, Mr. T. W. Wilson having asked for the name of a beetle which feeds on the tansy, commonly called the "tansy-beetle," is replied to by Mr. Edward Newman, who gave the scientific name, and added that "it occurs in marshy places in Yorkshire, Cambridgeshire and Norfolk, but that he did not recollect receiving it from any other county. I give the records in full, to enable the reader to judge whether or not the localities are in the West-Riding. My object, however, in writing this note is to ask a question. Will someone tell us by what name it is now known, as I do not find any such name as *Chrysomela fulgida* in Sharp's Catalogue of British Coleoptera; nor does the catalogue seem to afford a clue to the synonymy.—W. DENISON ROEBUCK, Sunny Bank, Leeds, March 17th.

Rainfall for February.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1879.	1878.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·96	21	3·20	* 5·57	16	0·76
†LEEDS ... (H. Crowther) ...	183	1·95	20	2·48	...	16	0·63
HALIFAX... (F. G. S. Rawson)	360	4·65	18	5·14	5·82	...	...
BARNLEY ... (T. Lister) ...	350	2·07	18	2·27	3·57	16	0·72
INGBIRCHWORTH (do.)	853	4·64	19	4·85	4·40	16	0·95
WENTWORTH CASTLE (do.)...	520	2·47	20	2·65	3·92	16	0·57
GOOLE ... (J. HARRISON) ...	25	1·43	15	1·83	3·79	16	0·52

* This is the average to date for 13 years, 1866-78.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting, March 16th.—An interesting paper was given by Mr. G. Griffiths, being observations from his note-book of birds, here and in his native district on the Welsh borders. A few additional plants were recorded in flower. Most of our resident songsters cheer us with their fuller melodies. The corn bunting was heard March 17th; the starlings, jackdaws, and rooks are busy in the fields picking up worms, grubs, &c.; and among the plantations and woods the last two have been engaged some weeks in carrying sticks and other materials for their nests. Mr. Hailstone writes on the 7th that the grey wagtail appeared on the Lawn at Walton Hall. This winter visitant to South Yorkshire has been rarely seen this scarce season. The pied wagtail—our resident bird of this family—appears more frequently than it did in the intensely cold months. March 10th, Mr. Berry reports a large flock of fieldfares in a field near Silkstone: he believes they are moving by daily stages to their breeding haunts in Norway. A few gulls have been noted. On the 18th another large flock of fieldfares was seen in a turnip-field at Day House. This bird, and its companion the red-wing, have only been noted at rare intervals this season.—T. LISTER.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, 1st March.—Mr. C. C. Hanson showed eggs of the lapwing, tern, jackdaw, red grouse, and swallow.—W. H. STOTT.

HUDDERSFIELD SCIENTIFIC CLUB.—March meeting, Mr. S. L. Mosley, president, in the chair.—Mr. C. P. Hobkirk exhibited *Brachytecium salebrosum*, gathered by the Rev. H. H. Wood in Dorsetshire, making the sixth British locality for the species; the chairman, a fine pair of the lesser kestrel, the male specimen killed by the Rev. George Armitage in Barbary, several years ago: the female from the Volga. Also a pair of the grey-headed wagtail, the male bird from Westphalia, and the female from Pomerania, May 18th, 1879. He also showed a series of the very dark unicolorous males of *Hibernia progemma*. The form—which is very different to the ordinary type—occurs pretty commonly in this district, and being unnamed, he proposed to call it var. *fuscata*. In the same box Mr. Mosley had a series of a *Microgaster*, bred from the pupa of *Pieris rapæ*; it was allied to, but distinct from *glomeratus*. Mr. G. T. Porritt showed a nice imago, with empty cocoon, of *Nola centonalis*, given to him by Mr. W. H. Tugwell of Greenwich, who had recently bred a series from eggs from an example taken in Kent in August last. Previously there were only three or four known British specimens. The periodicals laid on the table included the new “American Monthly Microscopical Journal,” “The Annual Report of the North Staffordshire Naturalist Field Club and Archæological Association,” &c. The president was elected the Club's delegate to the council of the Yorkshire Naturalists' Union.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting.—In the absence of a paper, the president, who occupied the chair, drew the attention of members to some recent publications on

Entomology, which he submitted by their notice, viz., Mr. Owen Wilson's "Larvæ of British Lepidoptera," and Mr. Mosley's "Illustrations of British Lepidoptera Varieties"; also the "Index Entomologicus," recently published by Dr. Katter of Berlin. The Rev. H. H. Higgins exhibited some very interesting illustrations of Japanese *Heterocera*, and Mr. Kinder specimens of *Sperchoeus emarginatus*—a water beetle lately taken plentifully near London after a disappearance of several years.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—369th meeting, Feb. 24th.—Vertebrate section, Mr. W. E. Clarke in the chair. The meeting was devoted to the reading of lists bearing on the vertebrate fauna of the Permian limestone tract, including the country about Staveley, Knaresbro', Ribston, Wetherby, Tadcaster, Bramham, Aberford, Sherburn, and Ledsham. The list of quadrupeds submitted was very meagre, and only included eleven species. The catalogue of birds was more satisfactory, and included 108 species, 57 being resident, 26 summer migrants, 10 winter visitants, and 15 stragglers or rare and accidental visitants. The latter class included some very rare birds, three of which—the orphean warbler, the cream-coloured courser, and Ross's rosy gull—are represented by extremely few, and in the last case by no other, British-killed examples. The list of reptiles was a meagre one, including five names only. Mr. John Grassham read a list of thirteen fishes, to be found in the Wharfe at Thorp Arch.

370TH MEETING, March 2nd.—Entomological Section, Mr. Henry Lupton in the chair.—The natural history of the Permian district was again gone into, notes on lepidoptera being communicated by various members. A discussion arose on the ease with which the burnets are exterminated. Mr. W. H. Taylor stated that *Zygæna filipendulæ* used to be common at Bramham about twenty years ago, but that when he collected there soon after, it had become extremely scarce. He also stated that many years ago a colony of burnets existed in the borough of Leeds, just beyond Wortley—now of course extinct. Mr. C. Smethurst reported a similar instance in a field near Horsforth. Mr. W. H. Taylor showed, for Mr. Thomas Benn, a drawer of geometers, which included a moth found in the streets of Leeds, of a form which cannot be well identified, but is supposed to be *Geometra papilionaria*. He also showed a box of the species of *Acronycta* and *Sesia*. Mr. John Grassham showed some interesting moths, mostly Bombyces; Mr. Washington Teasdale, F.R.M.S., dichroic scales of various lepidoptera, showing complementary colour according as they are viewed by transmitted or reflected light; Mr. F. Emsley, *Hydra viridis* from Sandal, near Wakefield, and, by special request, Mr. James Abbott brought his series of slides of the brain of the cockroach.

371ST MEETING, March 9th, Mr. B. Holgate, F.G.S., president, in the chair.—Lecture given by Mr. Frederick Greenwood, M.R.C.S.E., on "The Structure and Comparative Anatomy of the Heart," illustrated by diagrams and specimens.

372ND MEETING, March 16th, Mr. B. Holgate, president, in the chair.—Mr. W. E. Clarke exhibited a male and female shore lark (*Alauda alpestris*), shot at Spurn Head on the 13th of March. A large flock had frequented that part of the coast since last December, being especially partial to a large bed of wrack, or sea-weed. This bird had not occurred in any numbers on the Yorkshire coast for fifteen years. Mr. Walter Raine exhibited some skins of foreign birds, including a pair of Indian partridges, the night heron, the paradise fly-catcher, and belted kingfisher; Mr. Henry Lupton, a variety of *Cymatophora flavicornis*, in which the orbicular spot is yellow—an unusual circumstance; also a number of females of *Hybernica progemma*. All these insects he had lately captured within the borough of Leeds, at Hawksworth Wood. Mr. F. Emsley brought for exhibition the stomata and raphides of *Hyacinthus nutans*, the blue-bell.—W. D. R.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, 15th March.—Mr. Whitehead, the president of the Society, read a paper on the Inflorescence of Mosses, in which he showed the importance of these organs in the determination of species. In the works of Linnæus the fruits of mosses were erroneously described as anthers. The great German botanist, Hedwig, in his *Muscorum frondosorum*, demonstrated that other minute organs which he had discovered were really the true flowers of mosses. This was disputed on the high authority of Necker. The value of the organs pointed out by Hedwig was not fully appreciated until the studies of Bruch and Schimper were published in the grand *Bryologia Europea*. Mr. Whitehead pointed out the different modes of flowering, and showed that in a great measure the flowers of mosses were analagous to the flowers of flowering plants proper. After giving some practical hints of how and where to look for flowers, the members were invited to the inspection of a splendid microscopic mount of the flowers of *Cinclidium stygium*, from Malham Tarn, prepared by Mr. Whitelegg. The honorary secretary (Mr. Rogers) afterwards read a translation, by Dr. Wood, from the *Bryologia Europea* on the Inflorescence of the genus *Fontinalis*. Many rare local mosses were exhibited by Messrs. Cunliffe, Holt, and Wild. Mr. Thomas Brittain also exhibited several species of microscopic fungi, specimens of which he kindly distributed. The honorary secretary announced that he had received a magnificent collection of European mosses, which had been presented to the society through Dr. Wood, by Professor Schimper, of Strasburg.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, March 3rd, Mr. Wigglesworth, v.p., in the chair.—Mr. E. E. Talbot showed a variety of *P. pilosaria* taken February 28th; Mr. Wigglesworth, *Edemera cærulea*, Linn., taken at Wetherby, by Mr. Roebuck; also *Phlæophragus spadix*, Hbst, taken on the beach at Harwich, by Mr. J. J. Walton, R.N.

Diary.—Meetings of Societies.

- April 1. Bradford Scientific Association: Paper by J. Maffey, L.R.C.P. Selby Naturalists': Lecture on "The Development Theory of the Universe," by J. E. Clarke, B.A., B. Sc., of York.
- " 2. Goole Scientific Society.
- " 5. Huddersfield Scientific Club.
- " 6. Liversedge Naturalists'. Bishop Auckland Naturalists'. Leeds Naturalists' Club, &c.—Entomological Section.
- " 7. Wakefield Naturalists'.
- " 8. Bradford Scientific Association: Paper by P. Ross. Dewsbury Naturalists'.
- " 9. Huddersfield Scientific Club.
- " 13. Leeds Naturalists' Club, &c.—Microscopical and Botanical Sections. Bradford Naturalists' Society.—"Fossils."—H. Hebblethwaite.
- " 14. York and District Field Naturalists'.
- " 15. Bradford Scientific Association: Paper by J. Maffey, L.R.C.P. Selby Naturalists': Paper on "The Fauna of the District," by T. L. Matthewman.
- " 17. Huddersfield Naturalists' Society.
- " 19. Manchester Cryptogamic.
- " 23. Leeds Naturalists' Club, &c.—Vetebrate Section.
- " 22. Bradford Scientific Association.—Microscopical Evening.
- " 26. Lancashire and Cheshire Entomological.
- " 27. Leeds Naturalists' Club, &c. Lecture: "The two great Limestones of the West-Riding of Yorkshire," by Prof. A. H. Green, M.A., F.G.S. Bradford Naturalists'.—"The Fresh Water Mussel."—Mr. Lishman.
- " 29. Bradford Scientific Association: Paper by H. Rowntree.

WILL any Botanist meeting with *Potamogetons* or *Charas* during the ensuing season kindly send me fresh or dried specimens, especially if in fruit? I shall be very pleased to send rare Southern, South-eastern, or Eastern flowering plants in exchange, either living or dried.

(*P. crispus*, *densus*, and *polygonifolius* not wanted).—A. B., 107, High Street, Croydon, Surrey.

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PART I. FOR 1877, contains the commencement of "The Birds of Yorkshire," by Mr. W. E. Clarke; of an "Annotated List of the Land and Fresh-water Mollusca of Yorkshire," by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on "Yorkshire Macro-lepidoptera in 1877," by Mr. G. T. Porritt, F.L.S.; one on "Yorkshire Micro-lepidoptera in 1877," by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on "Yorkshire Diptera," and on the Yorkshire species of Hemiptera of the Family *Psyllidæ*; and a report on Yorkshire Botany in 1877.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding" on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidæ*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LVIII.

MAY, 1880.

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SHELL-HUNTING AT THE ANTIPODES.

BY THOS. BALL.

SOME time ago I left England for the Colony of New Zealand. Having seen a little of what the coast produces, I comply with a request to publish, in the hope that my notes may not be altogether without interest to readers of the *Naturalist*.

The shells here are very interesting to a stranger from the "old country," on account of the great novelty of the forms which they present, and their contrast to the genera with which he has been familiar, in the living state. He goes down to the coast line, perhaps through a Mangrove swamp, and the first shell he sees belongs to the curious genus *Amphibola*—so characteristic of this antipodal region. A flat through which I went down to the beach to-day is only covered with water at high tide, and was quite dry at my passing, but there the *Amphibola* was crawling in a lively manner by thousands—so thickly, indeed, that one could not avoid crushing the fragile shell.

Setting down to the coast, the first thing that struck me was the amazing abundance of an *Ostræa*, a species of rock oyster; for miles the rocks are covered with it. I had previously made acquaintance with this mollusc in the agreeable guise of an article of food. The flavour, at any rate in the cooked state, is about equal to that of our English "natives"; raw, it does not look quite so tempting, as the colour is slightly yellow—a tint to which one is not accustomed. But the disadvantage of tint is compensated by the cheapness of the article. Let an English lover of oysters try and fancy what it must be to get five score of his favourites for a shilling the lot!—which is the price of the animal in its shell. But then comes the process of opening. I tried knives of every known form, and worked round at every point of the circumference of the shell, but all in vain; the occupant never thought of yielding to anything less than a hammer and a cold chisel, and very reluctantly even to that. On account of the difficulty of opening, these oysters are usually sold taken out of the shells and bottled.

The next shell that strikes one is a relative of *Amphibola*, a pretty species of *Siphonaria*. Though so much like a limpet, it is at once distinguishable by its greater activity of movement, and by its sticking to the rock much less closely. Then come large Turbines and Trochi, and when one has only collected shells at home before, there is the

pleasant and novel sensation of tugging at a great big mollusc that requires both hands almost to push him off the rock. And you may have the pleasure of filling a basket with your captures as quickly as you had been accustomed to fill a little box. Chitons are very abundant, both in species and individuals, and are many of them of good size. The sub-genus *Katharina* is a novelty, and a very different object seen alive from what it is in the cabinet. There it is as black as a bit of leather, to which indeed it is not unlike. Living, it is a beautiful vermillion, and the mantle is granular. I had seen several individuals of a species of *Doris*, to which the *Katherina* bore such a close resemblance, that I had nearly passed it over; but happening to touch it, the hard plates could be felt below the mantle.

There is a large species of *Emarginula* with the shell all but the apex buried in the mantle, and in which the anterior slit has become such an imperceptible notch that it was a long time before I could see it. A beautiful Triton with an ivory mouth, ornamented with dark brown teeth, seemed to be a great prize, till I was informed the natives took any quantity of them to eat.

Most collectors are familiar with the *Parmophorus*, or duck's bill Limpet, but alive it presents a most unfamiliar appearance, and must bear the palm for ugliness in the molluscan kingdom. The shell (which is very small compared to the size of the animal) is entirely covered by it. It is, indeed, not so very much larger than the shell of *Limax maximus*, compared to that of the slug. The animal is black, and has a couple of short thick tentacles. The first I saw was squatting on a stone in an attitude which reminded me very much of a large toad, the tentacles resembling the fore paws. I took the thing for a monstrous *Aplysia*. On handling it, the creature emitted a copious lot of slime like a slug. Evidently there was something hard in the back, which on examination proved to be the ivory shell of the *Parmophorus*. This repulsive animal is a favourite article of food with the natives. I am told they wade into the sea at low water, and by running the hand along the ledges of rock under water, can easily feel the mollusc and bring it up. It is often found as large as the hand.

A word about land shells must bring these notes to a close. Woodward says—"The moist and equable climate (of New Zealand) is favourable to the existence of land shells," so I came with the hope of making speedy acquaintance with some of them. But for some time that hope was not realised—I could not find one; and I was quite ready to agree with another authority, who says that "New Zealand

appears to have been very much over-estimated with regard to land shells." The fact is, that though the climate is suitable, the soil is not, as in many districts of the country there is a total absence of limestone in any form. The consequence is, that shells that are at all conspicuous are found only in small areas, none of which I have yet seen. But I find there is a considerable number of very small species pretty generally diffused. They are thin and delicate, like our *Zonites*, but many of them are beautifully marked with zebra-like stripes and patches of colour, and, though small, are therefore interesting. Of fresh-water shells I have not yet been able to meet with a single specimen, with the exception of a *Unio*.

I understand there is an excellent catalogue of the New Zealand marine shells, to which, however, I have not yet had access, and so have had to omit specific names from my notes. Unfortunately no list of the land shells has yet been produced.

LINCOLNSHIRE COAST LEPIDOPTERA.

BY REV. W. FOWLER, M.A.

HOPING that some of our Yorkshire Naturalists will act upon Mr. Porritt's suggestion, and investigate the lepidoptera of the Lincolnshire coast during the coming season, it may be well for me to point out two or three accessible centres of operation in addition to Skegness. From Cleethorpes to Saltfleet there are mud-flats as well as sand-hills ; from Saltfleet to Gibraltar point, south of Skegness, sand-hills only ; and from Gibraltar point (near Wainfleet) to Boston, and round "The Wash" to Sutton Bridge, sloping turf walls and mud-flats, similar to those between Cleethorpes and Saltfleet, but more extensive. To all the places I have mentioned there are now railways, so that the lepidoptera of the coast could be easily worked (as the birds have been by Mr. Cordeaux), if those who make them their study would by way of a change, visit, say, Humberstone, near Cleethorpes ; Saltfleet ; Mablethorpe ; Gibraltar Point, near Wainfleet ; and Fosdyke, near Algarkirk station. They would thus secure both sand-hills and mud-flats, northern and southern species, and, as Mr. Porritt says—"add to our knowledge of the fauna of a district in which so little has as yet been done."

The wetness of the sand-hills at nights has been often noticed by me, and attributed to the radiating, and consequent dew-condensing, power of *Psamma arenaria*—a sea-grass which grows in great luxuriance there, and is called by the rustics "sines." On the Lancashire

sand-hills the grass is perhaps that of shorter species, so that on it less dew is deposited : or (as the amount of dew varies, of course, with the quantity of watery vapour in the air), it may be that its comparative absence at the time the Lancashire hills were visited by Mr. Porritt, was the reason why he found them, as he says, " perfectly dry."

CONTRIBUTION TO A LIST OF THE DIPTERA OF LANCASHIRE AND CHESHIRE.

(NORTH OF LANCASTER EXCEPTED).

(Continued).

BY BENJN. COOKE.

CONOPIDÆ.

- Conops aculeata. Warrington.
Myopa testacea. Stretford; Marple.
M. ferruginea. Manchester; Cheshire coast.

OESTRIDÆ.

- Oestrus bovis. Hazelgrove.

MUSCIDÆ.

- Bucentes geniculatus. Common.
Gonia capitata. Southport; Cheshire coast.
Tachina grossa. Warrington.
T. cæsia. Common.
T. detracta. Delamere.
T. viridis. Hazelgrove.
T. vulpina. Delamere.
T. lateralis. Bowdon.
T. simplex and conica. Southport.
T. agilis. Delamere.
T. larvarum. Southport.
T. hadensis. Bowdon.
T. leucocephala. Delamere.
T. hortulana. Manchester.
T. vulgaris. Manchester; Bowdon.
T. notabilis. Delamere.
T. spinipennis. Hazelgrove.
T. antiqua. Manchester; Bowdon; Southport.
Dexia volvulus. Manchester; Hazelgrove.
D. nigripes. Manchester; Bowdon.

- D. vacua*. Rivington.
D. canina. Delamere.
Trixa variegata. Delamere.
Sarcophaga carnaria and *melanura*. Common.
S. agricola. Bowdon.
S. nigriventris. Southport.
S. mortuorum. Greenfield.
Musca erythrocephala, *vomitaria* and *Cæsar*. Common.
M. cornicina. Bowdon; Stalybridge.
M. equestres. Manchester; Southport.
M. vespillo. Southport; Manchester; Hazelgrove; Rivington.
M. rudis and *domestica*. Abundant.
M. cadaverina. Bowdon.
M. hortorum and *stabulans*. Abundant.
M. maculata. Rivington; Bowdon; Hazelgrove.
M. meditabunda. Bowdon; Knutsford.
M. meridiana. Manchester; Hazelgrove; Bowdon.
Stomoxys calcitrans. Abundant.
Polietes lardaria. Abundant.
P. albolineata. Manchester; Bowdon; Knutsford.
Hyetodesia interlatens. Southport.
H. basalis. Delamere.
H. signata. Manchester; Delamere.
H. populi. Bowdon.
H. umbratica. Hazelgrove.
Mydæa pagana and *urbana*. Common.
M. defecta. Manchester; Delamere.
M. impuncta. Bowdon; Cheshire coast.
M. varians. Bowdon.
Spilogaster lucorum. Manchester; Rivington; Bowdon.
S. notata. Bowdon; Knutsford.
S. vagans. Delamere.
S. uliginosa. Manchester.
S. tetrastigma. Hazelgrove.
S. impulsa. Southport; Cheshire coast.
S. communis. Bowdon.
S. repulsa. Manchester; Bowdon.
S. duplicata. Bowdon.
S. anceps. Bowdon.
Hydrophoria conica. Common.
H. subtracta. Manchester; Delamere.

- Drymeia hamata*. Manchester; Hazelgrove; Bowdon.
Hydrotæa dentipes. Common.
H. irritans. Rivington; Bowdon.
Lasiops fumosa. Manchester; Rivington.
L. cunctans. Manchester; Hazelgrove.
L. anthomyinus. Manchester.
Homalomyia scalaris. Manchester.
H. maniculata. Manchester.
H. canicularis. Abundant.
H. serena. Manchester; St. Anne's.
H. aerea. Rivington.
H. rufipes. Bowdon.
Azelia Maequarti. Manchester; Bowdon; Delamere.
A. triquetra. Manchester; Bowdon.
Anthomyia radicum. Abundant.
A. pluvialis. Manchester; Rivington; Hazelgrove; Bowdon.
Hylemyia variata. Bowdon.
H. pullula. Manchester.
H. flavipennis. Hazelgrove.
H. coarctata. Manchester.
H. strigosa. Hazelgrove.
H. præpotens and *ferrugines-vittata*. Common.
Chortophila lepida. Manchester; Bowdon.
C. angustifrons. Manchester.
C. incisurata. Manchester; Southport; Bowdon.
C. floralis. Manchester; Southport.
C. albula. Bowdon.
C. stricta. Hazelgrove; Bowdon.
C. candens. Southport.
C. arenosa. Southport; Cheshire coast.
C. varia. Manchester.
C. bicolor. Manchester; Knutsford.
C. versicolor. Hazelgrove; Bowdon.
C. transgressa. Bowdon.
Lispe aurulans. Southport; Lytham.
Coenosia sexpustulata. Bowdon.
C. triangula and *nigripes*. Manchester.
C. pallicornis. Southport.
Myopina reflexa. Bowdon.

(To be continued.)

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

ONAGRACEÆ.

- Epilobium angustifolium*, L. Frequent about cottages in both counties.
E. hirsutum, L. (A) Near Friars, Lleiniog river; (C) Frequent on the sides of ditches and rivers.
E. montanum, L. Frequent in both counties.
E. tetragonum, L. do. do.
E. alsinifolium, Vill. (C) Aber waterfall, Carnedd, Llewelyn.
E. alpinum, L. (C) Twll du.
Circæa lutetiana, L. Abundant in both counties.

HALORAGIACEÆ.

- Myriophyllum spicatum*, L. (A) Cors ddygai, &c.; (C) about Llandudno, &c.
M. verticillatum, L. (A) Cors ddygai, &c.
Hippuris vulgaris, L. (A) Cors ddygai, &c.

LYTHRACEÆ.

- Lythrum Salicaria*, L. Frequent in wet ditches and marshy places in both counties.

CRASSULACEÆ.

- Cotyledon Umbilicus*, L. Abundant in both counties.
Sedum Rhodiola, D.C. Plentiful at Twll du, Ysgolion Duon, &c.
S. Telephium, L. (A) Garth Ferry, &c.; (C) Deganiog Rocks and Bangor, &c.
S. anglicum, Huds. Abundant in both counties.
S. dasyphyllum, L. (C) Conway, &c.
S. acre. (A) Llandisilio, &c.; (C) Llandudno, &c.
S. sexangulare, L. (C) Bodysgullen, near Llandudno.
S. rupestre, Huds. Penmaenmawr, Twll du, &c.
S. Forsterianum. (C) Little Ormshead, Nant Francon.
S. reflexum, L. (A) Walls, Plas Berw.
[*Sempervivum tectorum*, L.] Common on roofs and walls of old cottages in both counties.

GROSSULARIACEÆ.

- Ribes Grossularia*, L. Not uncommon in hedges in both counties.

SAXIFRAGACEÆ.

- Saxifraga oppositifolia*, L. (C) Twll du, &c.
S. hypnoides, L. (C) do.
S. cæspitosa, L. (C) Twll du.
S. tridactylites, L. Frequent in both counties.
S. nivalis, (C) Snowdon, &c.
S. stellaris, L. (C) Aber Lake; Ysgolion Duon.
S. umbrosa, L. Frequent about old cottages.
Chrysosplenium oppositifolium, L. Common in both counties.
Parnassia palustris, L. (A) Cors hendre, near Pentraeth; (C) near Llanberis.
Drosera rotundifolia, L. Abundant in bogs in both counties.
D. longifolia, L. (A) Llanfair, P. G., and near Ty Croes.

UMBELLIFERÆ.

- Hydrocotyle vulgaris*, L. Common in bogs in both counties.
Sanicula europæa, L. Common in woods in both counties.
Eryngium maritimum, L. (A) Towyn Capel, near Holyhead, &c. (C) Abundant in Conway marsh, &c.
Apium graveolens, L. (A) Beaumaris Castle and near Penmon. (C) Bangor between Friars School and Sea, &c.
Helosciadium nodiflorum, Koch. (A) Cadnant Dingle, &c. (C) Bangor on side of Glasinfryn Road, &c.
H. inundatum, Koch. (A) On the margin of a small pond in a heathy ground near Porth dafarch, Holyhead.
Egopodium Podagraria, L. (C) Frequent near Bangor, also Menai Bridge, &c.
Carum verticillatum, Koch. (C) Near Beddgelert.
Sium latifolium, L. (A) Cors ddygai.
S. angustifolium, L. Frequent in wet ditches in both counties.
Pimpinella Saxifraga, L. Frequent in both counties.
Enanthe fistulosa, L. (A) South side of Coron Lake.
E. pimpinelloides, L. (A) Cors-hendre, nr. Pentraeth. (C) Under Gorddinog, Llanfairfechan.
Æ. crocata, L. Abundant in both counties.
Æthusa Cynapium, L. Abundant in both counties.
Foeniculum vulgare, Gært. (A) Common about Menai Bridge; (C) Great Ormshead, &c.
Crithmum maritimum, L. Common around the coast of both counties.
Angelica sylvestris, L. Frequent in both counties.
Heracleum Sphondylium, L. Abundant in both counties.
Scandix Pecten-Veneris, L. (C) Great Ormshead.

- Myrrhis odorata*, Scop. Not uncommon about cottages.
Bunium flexuosum, With. Frequent in both counties.
Cherophyllum temulum, L. Frequent in both counties.
C. sylvestre, L. Abundant in both counties.
Torilis nodosa, Gaert. (C) Common about Bangor, Llandudno, &c.
T. Anthriscus. Frequent in both counties.
Daucus Carota, L. Abundant in both counties.
Conium maculatum, L. (A) Not uncommon; (C) Bangor, Great Ormshead, &c.
Smyrniolus Olusatrum, L. (A) Gallow's Point, Puffin Island, &c., (C) Tan yr allt Woods, Bangor, Conway Castle, &c.

(To be continued.)

Short Notes and Queries.

THE BADGER NEAR PICKERING.—When on my holidays last August, in the neighbourhood of Pickering, I was interested to learn that the badger was still to be regarded as a native of that part of Yorkshire. I was told that Mr. Marfitt, grocer, of that town, had one on his premises which had been caught in the neighbourhood. I called on him, and he was good enough to show us the animal alive and apparently well. He kept it in an outhouse in an enclosed yard, and would have shown us more of it in the yard if it had not displayed such a very strong objection to leaving the side of the wall, against which it laid very closely and very determinedly, whilst Mr. Marfitt endeavoured to force it away with a stout stick. It kept up a sort of savage grunt, and bit very hard at the stick. At length he got it partly out, and to stand up so as to afford us a good view of it. Mr. Marfitt had a colley dog, which he put into the place with it, but the dog beat a hasty retreat with its tail between its legs. He gave us various interesting particulars of the method in which the badgers are captured, and stated that he had had one before this. The badger-hunters usually set off from Pickering in the evening, the distance being about seven miles. They arrive at the place shortly before midnight. In company with a keeper who knows their haunts, the hunters keep very still until the badgers go out to feed; they then get very quietly up to their burrows, into the mouth of which is inserted a bag with slots across it. The greatest caution has to be observed, or the badgers will not leave their holes, or having left them, will rush back on the slightest unusual sound, and before the preparations for their capture are completed. All being ready, the dogs which accompany the hunters are sent into the woods, whereupon the badgers rush in hot haste to get "bagged." I was told by Mr. Marfitt that with their strong claws the badgers can penetrate a long way into the ground in a very short time; and that it is a most difficult thing for any dog which may be sent into the holes to dislodge the inmate, as the badger usually makes a sort of

ledge or shelf in its burrow, upon which it rests, above the level of the burrow itself, and upon this ledge it *sticks like wax*. On one of our fishing excursions we visited the place where these badgers were captured, and where others of their species still exist. Following a small beck, we had to force our way at times through the bushes and under-wood, and had several ugly falls where trees had been uprooted and holes left which had grown over with vegetation. Had it not been for the existence within a mile or two of a line of railway, I should have considered this spot to be one of the quietest and most out-of-the-way places left in our county ; and that in fact it is so, is proved, I think, by the above captures and the continued presence of such an animal as the badger.—RICHARD ANDREWS, Leeds, Jan. 20th.

NESTING OF THE KINGFISHER.—Mr. Alfred Roberts, of Scarborough, recently communicated to the Leeds Naturalists' Club the following note on the kingfisher continuing to breed in the same hole after a second robbery of her eggs. In May, 1868, a man brought him six beautiful fresh eggs of the kingfisher, taken from a hole in a bank at Scalby Beck, near Scarborough. In the beginning of June of the same year he brought six more as fresh and fine as the first lot. On being asked from where he had got them, the man said they were from the same nest as those he brought before. In July following, he brought five more from the old nest.

ARRIVAL OF MIGRANTS, 1880.—Swallow, April 16th ; Ray's wagtail, 17th ; willow wren, 17th ; redstart, 17th ; cuckoo, Ryburne Valley, 20th.—F. G. S. RAWSON, Ryburne Valley, Halifax.

A NEW WEST YORKSHIRE MOSS—*Eurynchium striatulum*.—On Easter Monday, whilst walking with Mr. M. B. Slater from Tanfield to Mickley, I gathered off a fallen tree bole, on a wooded bank half-way between Tanfield bridge and Mickley village by the field path, a quantity of a glossy green, creeping, pinnately-branched moss, with plentiful smooth reddish setæ ; but for the most part the sporangia were past their prime, a few only still retaining their long pointed, conical lids. It had to my eyes in the field somewhat the aspect of *B. plumosum*, or *E. myosuroides*, and I so remarked to Mr. Slater, who replied that it was more like a small *glareosum*. This moss turns out to be *Eurynchium striatulum*, Spruce ; hitherto known only from Sussex (Mitten), near Castle Howard (Spruce), Somersetshire (Berkeley), North Lincolnshire (Lees), Killarney (Wilson), and Wicklow (Moore) ; and curiously enough, it is a Pyrenean species, which (so far as my present knowledge goes) has hitherto occurred in several of the counties furnishing another Pyrenean species, *B. salebrosum*, Hoffmann. The form found by me in 1877, in Legsby Wood, near Market Rasen, has the leaves somewhat more squarrose, and the branchlets more curved (*E. circinnatum*-like) than Westphalian and Sussex scraps of the same moss with which Mr. Boswell has furnished me. The Mickley plant is very like the Westphalian. It is a welcome and notable

addition to our West Yorkshire flora, which now numbers 348 species, inclusive of one—*Amblystegium heterocladum*, Mgg.—which is absolutely new to Britain, and which I hope soon to describe.—F. A. LEES.

Obituary.—DR. SCHIMPER.—It is with much regret we have this month to chronicle the death of our greatest modern bryologist—Dr. Wilhelm Phillippe Schimper, Professor at the University, and Director of the Museum, at Strasbourg, which took place on the 20th March last. Our space will not allow of any extended notice of the life of this great botanist; but his works, which have made his name of world-wide renown, must have our humble tribute to their value. His greatest work, the *Bryologia Europea*, which contains descriptions and magnificent plates of all the then known European species of mosses, was the result of the joint labours of M. Bruch and himself. Its publication commenced in 1836, when M. Schimper would be only 26 years of age, and the last portion—Corollarium—was completed 19 years afterwards (1855). The first edition of his “Synopsis Muscorum Europæorum” was published in 1860, followed in 1864-5 by the “Supplementum Bryologia, or Musci Europæi Novi,” of which only some four or five parts were issued; and in the beginning of 1876 a second and much enlarged edition was issued of the “Synopsis.” Dr. Schimper paid visits to England more than once, the last occasion being in 1866, when he made collecting excursions to Scotland and Ireland in company with Mr. Wilson, Dr. Wood, Dr. Moore, Mr. Hunt, &c. His name is commemorated in the specific designations of several mosses; but, apart from that, his published works are sufficient to perpetuate the renown of this great and accomplished bryologist.

NOTICES OF BOOKS, &c.—“The Geological Antiquity of Insects, by Herbert Goss, F.L.S., &c.”: London, Van Voorst (1s. 6d.)—Under the above title Mr. Goss has republished, in a separate form, the twelve papers on Fossil Entomology, with additions, which he has contributed to the *Entomologists' Monthly Magazine*, vols. xv. and xvi. We desire, and can confidently recommend to all our entomological friends the careful perusal of this reprint, in the full assurance that they will be amply repaid. It contains a compendious account of all that is known on the subject, with copious references to all the chief authors and their works, who have investigated this interesting study, which has been too much neglected in England. Our space will not permit us to enter into any detailed account of its contents, but we may say that it contains detailed lists for each geological formation, both in England and abroad, of the orders, genera, and in some cases species, of the remains of insects which have been found or recorded down to the present date, and we trust only forms the basis for a much larger work on the same subject, which we are convinced our author is well qualified to undertake, and bring to a successful issue. Let all our entomological and geological friends obtain it without delay.

"The British Moss Flora : by R. Braithwaite, M.D., F.L.S."—We gladly call the attention of our bryological readers to the advertisement sheet issued with this number, announcing the above work. The well-known painstaking investigations of its author are sufficient to recommend it, but we may be allowed to add, having personally seen the drawings illustrating the first monograph, that they are all that can possibly be desired.

Rainfall for March.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880. \$	1879. \$		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·85	10	6·05	* 7·86	2	1·47
LEEDS ... (H. Crowther) ...	183	†					
HALIFAX... (F. G. S. Rawson)	360	3·64	9	8·78	8·79	..	...
BARNSELY ... (T. Lister) ...	350	2·25	7	4·52	4·70	2	0·72
INGBIRCHWORTH (do.)	853	3·98	11	8·83	6·42	2	1·80
WENTWORTH CASTLE (do.)...	520	2·70	8	5·35	5·18	2	1·32
GOOLE ... (J. HARRISON) ...	25	2·54	8	4·17	3·38	31	0·86

§ We regret that by an oversight the heading of these two columns has not been changed in our March and April issues.

* This is the average to date for 13 years, 1866-78.

† No returns.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting, March 30th.—The last paper of the session was given by Mr. Mitchell: subject, "Some Thoughts on Botany." The report of the ornithological section to date gives very early notices of spring migrants. Mar. 14, the chiff-chaff; 19, willow warbler; 27, wheatear, on N. Yorkshire moors; April 1, Mr. Hailstone notes a pair of swallows over Walton lake; 3rd, a pair of sand martins seen by W. and C. Hutchinson at Old Mill, Barnsley, not seen since then; 4th, wheatear, near Barnsley; 6th, Ray's wagtail, Gawber fields; 8th, cuckoo, seen by Mr. T. Dymond at Burntwood Hall; 9th, whinchat, Silkstone Common; 11th, ring-ouzel, first noted by Mr. Reginald Bury on NW. Yorkshire moors; 16th, swallows in Dearne valley; 17th, Mr. Hailstone writes that swallows reappeared after their passing visit on April 1st; on same date, the tree pipit near Barnsley; W. Barraclough reports the goatsucker near New Park, where it sometimes breeds. 20th, the corncrake heard on Cockerham Road. Of migrants going north, the last flock of fieldfares seen was at Ferry Moor on Good Friday; April 9th, last redwings observed near Barnsley; 20th, Mr. Hailstone reports a pair of terns on Winterset reservoir.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting 16th April, Mr. S. L. Mosley, president, in the chair.—Mr. Hobkirk placed on the table the following mosses :—*Zygodon Nowellii* from Dowkgill, and *Orthothecium rufescens*, Heseltine Ghyll—both from Mr. W. West ; *Myrinia pulvinata* fr., *Leucobryum glaucum* fr., *Barbula Brebissoni* fr., all from Dorset, gathered by Rev. H. H. Wood ; *Hycomium flagellare* (floating form), *Rhabdoweissia denticulata* fr., *Tetraplodon mnioides* fr., *Andræa alpina* fr., all from N. Wales, by Mr. T. W. Naylor Beckett, F.L.S. : also some specimens of a beetle, *Bruchus granarius*, which has been found very copiously in seed-beans in the district. Mr. Geo. Brook ter., F.L.S., read a paper on “The Marine Zoology of Guernsey,” and exhibited, in illustration, the following specimens gathered by him during his recent visit :—(Star-fish, urchins, &c.) *Lindia fragillissima*, *Uraster glacialis*, *Ophiocoma granulata*, *Ophiura albicans*, *Echinocyamus pusillus*, *Comatula rosacea* ; (Shells) *Haliotis tuberculatus*, *Pecten maximus*, *Mactra stultorum*, *Ostræa* (pearl oyster), *Hermione hystrix*, &c.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting April 5th, the president, Mr. S. J. Capper, in the chair.—The president drew the attention of members to the public results of the investigation into the economy and occurrence of insects injurious to crops, set on foot by Miss E. A. Ormerod and others, and in which work several members of the society had taken an active share. Mr. Willoughby Gardner read a paper on “The Rise of the Literature of Entomology,” in which he traced the course of that branch of natural science from the time of Aristotle to the publication of the treatises of Dr. Moufitt in 1635. The following specimens were exhibited by the president :—Singular variety of *Mania typica*, *Ypsipetes impluviata*, and *Lithosia quadra*.

LEEDS GEOLOGICAL ASSOCIATION, April 5th.—Mr. Thos. Tate, F.G.S., Bradford, delivered a lecture entitled “Extra-Terrestrial Rocks and their Terrestrial Allies.” Meteorites, from which examples were chiefly drawn, are either native iron associated with nickel and cobalt (Siderites) ; spongy iron, whose cavities are charged with stony matter (Siderolites), or stony with particles of iron diffused through the mass (Aerolites). To the last group belong the singular carbonaceous meteorites consisting of iron and carbon, which are preserved only when they happen to fall upon ice or snow. No meteorite has, as yet, given evidence of its having crystallised from an aqueous solution, but all appear to have passed through a fiery ordeal. Three minerals have been discovered not present in terrestrial rocks, and incapable of forming under terrestrial conditions, in the presence of atmosphere and water—a proto-sulphide of iron (troilite), phosphides of iron and nickel (schreibersite), and a monoclinic silica (asmanite). The familiar volcanic minerals, enstatite, olivine, &c., chiefly silicates of magnesium or iron, having the base largely in excess of the silica, form the bulk of these extra-terrestrial bodies, and are such as are found only in the ultrabasic series of terrestrial rocks, the heaviest,

most unstable, and deepest seated of igneous products, and the last to be ejected during a prolonged volcanic outpour. At times these bring up with them grains of unoxidised iron, showing Michenstatt lines similar to those exhibited by meteoric iron when etched out with acid. In some instances, more particularly those of Ovifak, Greenland, these volcanic products have been mistaken for meteoric matter supposed to have fallen at the moment of eruption, and there are reasons for suspecting a like confusion in other examples from Hungary, the Urals, Mexico, and elsewhere. The inference that may be fairly drawn from these investigations is that the extra-terrestrial bodies scattered like dust through cosmic space are built up of the same materials as constitute the interior of our globe. At the close of the lecture Mr. Tate exhibited specimens of meteorites, &c., and also some beautifully prepared microscopic sections of various minerals, in illustration of his remarks.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—373rd meeting, Mar. 23rd, Mr. W. B. Turner, F.C.S., vice-president, in the chair.—Mr. B. Saynor exhibited the pork-entozoon (*Trichina spiralis*), the life history of which was detailed by him and Mr. Abbott. Mr. Washington Teasdale, F.R.M.S., showed diatomaceæ from Santa Monica, containing some hitherto unknown forms. The chairman, a gathering of fresh-water algæ from Sutton Park, Birmingham, sent by Mr. A. W. Wills, which included *Desaridium*, *Hyalotheca*, *Coleochaete*, *Tabellaria*, *Melosira*, and the curious and rare *Asterionella formosa*. Mr. F. Emsley drew attention to the leaf-glands of *Drosera rotundifolia* and *D. longifolia*. Mr. E. Thompson, a form of apertometer, for measuring approximately the angular aperture of object glasses. In botany, Mr. J. R. Murdoch showed a long series of the genus *Trifolium*; Mr. C. Smethurst, a black variety of *Phigalia pilosaria*, from Meanwood.

374TH MEETING, Mar. 30th, Mr. Henry Lupton, vice-president, in the chair.—Two very destructive beetles were shown—*Phratora vulgatissima*, which defoliates willows by the acre at Knottingley; and *Otiorhynchus sulcatus*, very injurious to vines in Huddersfield greenhouses. Mr. C. Smethurst showed the lepidoptera he had taken at the Masham excursion, including *Anisopteryx æscularia*, &c. Mr. W. H. Taylor opened a discussion as to the systematic position of the “clear-wings” of the family *Ægeriidae*. The progress of the list of insects which are found on the magnesian limestone about Bramham, &c., was reported, the lepidoptera counting up to 453 species, and the beetles to about 35. It was mentioned, on the authority of Mr. John Smith of Bramham, that *Zygæna filipendulæ* is not extinct in his district, as was reported. Mr. Smith in the same letter stated that last autumn he saw *Vanessa Antiopa*, but did not capture it. Mr. J. R. Murdoch showed living specimens of marine animals from Scarborough, including *Pagurus Bernhardus* (hermit crab), *Echinus miliaris* and *E. esculentus* (sea-urchins), *Uraster rubens* (star-fish), besides various sea anemones and marine algæ. Mr.

W. E. Clarke, a recently taken Yorkshire egg of the raven—a bird which it is satisfactory to know is not extinct as a resident in the county.

375TH MEETING, April 6th, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. Washington Teasdale, F.R.M.S., gave a lecture on “The Lantern as a means of illustrating Scientific Lectures.” In illustration he showed with the sciopicon a very large number of selected representative slides.

376TH MEETING, April 13th, Mr. W. B. Turner, F.C.S., F.R.M.S., vice-president, in the chair.—Microscopical evening, the special subject taken being micro-conchology. The chairman introduced the subject by describing the various forms of shell structure, the value of the palates or odontophores in generic distinctions, and other points, references being given to bibliography. A large number of slides were shown by various members, including palates of *Buccinum*, *Patella*, *Valvata*, *Physa*, *Helix*, *Aplysia*, *Limax*, *Haliotis*, *Trochus*, *Chiton*, and *Nassa*; a series of the genus *Pisidium*, collected in Holderness by Mr. Butterell; sections of *Pinna* and *Haliotis*; *Spirorbis*, fossil; nervous ganglia and nerve cells of *Limax*; young of *Physa*, *Ostræa*, and *Planorbis* (mounted); and living young of *Planorbis corneus*. Mr. J. R. Murdoch exhibited in botany a series of Cornish heaths (*Erica*), and of interesting ferns. Birds' eggs were shown by Mr. Walter Raine, and Yorkshire specimens of lepidoptera by Messrs. Roebuck and Smethurst. Mr. Teasdale showed Warrington's aquarium-microscope, and an ingenious revolving stage-diaphragm of his own design. Mr. Alfred Allen, secretary of the Postal Microscopical Society, took part in the meeting as a visitor.

YORKSHIRE NATURALISTS' UNION.—The season of 1880 was opened by an incursion into the North Riding, and the northern edge of the West Riding, Masham being chosen as the place of meeting, and Easter Monday, which fell so early as the 29th of March, being the date. Several of the members got off at Ripon, but the main body proceeded to Tanfield station, with the intention of visiting Hackfall, admission to which, as well as to Studley Royal and Fountains Abbey, was most kindly and freely granted by the Marquess of Ripon. Both places were visited, as well as other parts of the picturesque country about Ripon. The meeting, which was held at the King's Head Inn, Masham, was attended by about thirty members, and the chair occupied by one of the vice-presidents, Rev. Wm. Fowler, M.A. The societies represented were—Huddersfield, Ovenden, Liversedge, and Bradford Naturalists' Societies, Leeds Naturalists' Club, Huddersfield Literary and Scientific Society, Huddersfield Scientific Club, Leeds Conchological Society, Leeds Geological Association, Bradford Scientific Association, and Dewsbury Naturalists' Society. The list of new subscribers, to whom thanks were voted, included Messrs. J. H. Gurney, jun., F.Z.S., Norwich, J. Jackson of Wetherby, W. K. McGhie of Rastrick, P. W. Lawton of Easington, J. H. Carter of Leeds, Geo. Roberts of Lofthouse, and John Brown,

Miss M. Morton, Rev. Edward Gray, and Rev. H. H. Slater, B.A., F.Z.S., of Ripon. Mr. W. Denison Roebuck of Leeds proposed, and Mr. F. Arnold Lees, F.L.S., of Wetherby, seconded a vote of thanks to the Rev. H. H. Slater, B.A., F.Z.S., for his services as local secretary, and to the Marquess of Ripon for permission to visit his estates. Mr. Roebuck remarked that in Mr. Slater, who has recently come into Yorkshire, the Union has received a welcome addition to its working strength. Mr. Slater was one of the three naturalists who accompanied the Transit of Venus expedition to Rodriguez, and a naturalist of considerable attainments in various branches. A vote of thanks was also passed for certain donations of books as a nucleus of a library. The Sectional Reports were then called for, as follows:—Mr. F. Arnold Lees, F.L.S., secretary of the Botanical Section, stated that 83 phanerogamia and ferns were observed during the day, only twelve of which were in bloom, owing to the early date of the meeting, and the lateness of the season. The only four species worthy of mention were *Draba verna*, *Adoxa Moschatellina*, *Chrysosplenium alternifolium*, and *Veronica montana*. Mr. Wm. West, cryptogamic secretary of the Botanical Section, reported about 82 species of mosses observed, including *Pterygophyllum lucens*, *Eucladium verticillatum*, *Dichodontium pellucidum*, *Hypnum stramineum*, and *H. Schreberi*. Seventeen species of Hepatics were observed, the rarer of which were—*Lejeunia serpyllifolia*, *Ptilidium ciliare*, *Frullania dilatata*, and *Jungermannia connivens*. Nine common species of lichens were seen. A few fungi were noticed, *Æcidium Ficariæ*, and *Melampsora salicina* being amongst them. Several algæ were collected, including *Chroolepus aureum*. The officers of the Vertebrate Section being absent, Mr. E. E. Prince, of Leeds, stated that but little had been observed. The squirrel was seen at Tanfield, and large quantities of dead moles in the grounds at Hackfall; while of birds none but common species had been noticed. Mr. W. Cash, F.G.S., president of the Conchological Section, reported that nine species of fresh-water and 25 species of land shells had been met with during the day. In the Fluvial species the most interesting were *Ancylus lacustris*, v. *compressa*, obtained by Mr. Cash from the leaves of the yellow water-lily at West Tanfield, and two of Colbean's varieties (*undulata* and *trifasciata*) of *Neritina fluviatilis*, collected by Mr. J. W. Taylor in the river Ure at Hackfall. The most remarkable land shells collected were *Helix sericea*, var. *cornea*, found at Hackfall by Mr. Nelson, and *Clausilia laminata* at Tanfield by Mr. Cash. For the Entomological Section, the president, Mr. G. T. Porritt, F.L.S., reported that in consequence of the early period of the year, and of the recent east winds, very little had been done, and the few species observed were of the commonest description. He had no doubt, however, from the nature of the ground, that later in the year it would prove a very good district. The Geological Section was represented by its president, Prof. A. H. Green, M.A., F.G.S., and its secretary, Mr. James Spencer [no report received.]—W. D. R.

Diary.—Meetings of Societies.

- May 3. Huddersfield Naturalists' Society.
 „ 4. Leeds Naturalists' Club, &c.—Entomological Section. Liversedge Naturalists'. Bishop Auckland Naturalists'.
 „ 5. Wakefield Naturalists'.
 „ 6. Bradford Scientific Association.
 „ 11. Bradford Naturalists' Society.—“Astronomy.”—Mr. Illingworth. Leeds Naturalists' Club, &c.—Microscopical and Botanical Sections.
 „ 12. York and District Field Naturalists'.
 „ 13. Dewsbury Naturalists'. Bradford Scientific Association: Paper by Mr. H. Rowntree.
 „ 14. Huddersfield Scientific Club.
 „ 15. Huddersfield Naturalists'.
 „ 17. Manchester Cryptogamic. Yorkshire Naturalists' Union.—Excursion to Malton.
 „ 18. Leeds Naturalists' Club, &c.
 „ 25. Bradford Naturalists' Society.—“Marvels of Pond Life.”—Mr. Waddington. Leeds Naturalists' Club, &c.—Vetebrate Section.
 „ 29. North Staffordshire Field Naturalists'.—Excursion to Marple, in conjunction with the Manchester Clubs: Leader, Mr. Potter.
 „ 31. Huddersfield Naturalists'. Lancashire and Cheshire Entomological.

WILL any Botanist meeting with *Potamogetons* or *Charas* during the ensuing season kindly send me fresh or dried specimens, especially if in fruit? I shall be very pleased to send rare Southern, South-eastern, or Eastern flowering plants in exchange, either living or dried.

(*P. crispus*, *densus*, and *polygonifolius* not wanted).—A. B., 107, High Street, Croydon, Surrey.

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of “The Birds of Yorkshire,” by Mr. W. E. Clarke; of an “Annotated List of the Land and Fresh-water Mollusca of Yorkshire,” by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on “Yorkshire Macro-lepidoptera in 1877,” by Mr. G. T. Porritt, F.L.S.; one on “Yorkshire Micro-lepidoptera in 1877,” by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on “Yorkshire Diptera,” and on the Yorkshire species of Hemiptera of the Family *Psyllidæ*; and a report on Yorkshire Botany in 1877.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' “Moss-Flora of the East-Riding”; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S., and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LIX.

JUNE, 1880.

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Original Articles.

THE BUTTERFLIES OF NORTH WALES, 1876-80.

BY S. D. BAIRSTOW, F.L.S.

A SHORT time ago I took occasion, with the assistance of Mr. D. Elias, Pentraeth, to complain, through the newspapers, of an apparent scarcity of entomologists or Natural History societies in the counties bordering the coast line of North Wales. I received numerous communications upon the subject, but there was lacking an authoritative and proficient naturalist to take the initiative, or, if such did exist, he did not seem willing to apply himself to the task before him.

From my own brief personal observations, whilst occasionally passing through the country (I visit Wales about thirty days out of the year), I venture to opine that this district is rich in botanical results, and food-plant must be, and undoubtedly is, productive of treasure to the entomologist who is willing to search for it. My desire, in giving the following list—small as it seems—is to give a stimulus to the exertions of would-be lepidopterists, who I sincerely hope will join hand-in-hand with others in forming societies of their own, for the sake of mutually benefiting each other, and in furtherance of that good old cause—the love of nature.

I hope this List of Butterflies will call forth some response. Many more species, I fancy, could be added, as well as new localities.

Argynnis Paphia. Bettws-y-coed and Festiniog vale; very occasional.

A. Aglaia. On the mountain bogs at Penrhyn Dudriath. Newman gives as a locality “the sea coast near Beaumaris, on a bank close to the Menai.”

A. Adippe. One specimen from the Park Lake Bog; Llanrwst.

A. Euphrosyne and *A. Selene*. These both occur at Penrhyn Dudriath, the latter very commonly.

Melitæa Artemis. One very fine specimen from Penrhyn D.

Vanessa urticæ. Abundant.

V. polychloros. One from Colwyn.

V. Antiopa. Bay woods. Taken at Pensarn, Abergele. August 28th, 1872, by Mr. R. A. Barker. The specimen has strikingly the English characteristic—the white border: S. J. Capper. About half-way up Penmaenmaur, Sept. 2nd: Field. On the high road between Colwyn and Conway, Aug. 27th: W. R. Callender.

V. Io. Swarms in a field adjoining a fir wood near Penrhyn D. Common on the Penmaen mountains.

- V. Atalanta*. Common.
- V. cardui*. Llanrwst, Bettws-y-coed, Festiniog, Bethesda, Carnarvon, Amlwch, Beaumaris, Bangor, Llanberis. Very common this year in the suburban lanes of Rhyl.
- Satyrus Egeria*. Common in all the woods; swarms at Carnarvon, just outside the town.
- S. Megæra*. Very common; Rhyl, Llanrwst, Festiniog vale, Bettws, Bangor, Penmaenmaur, &c.
- S. Semele*. Same as preceding.
- S. Janira*. do. do.
- S. Tithonus*. This I have found one of the commonest insects on the coast.
- S. Hyperanthus*. Fairly common; Llandudno, Deganwy, Vales of Festiniog and Llanrwst, Carnarvon, Beaumaris, Bangor, Criccieth, Portmadoc, &c.
- Chortobius Pamphilus*. Abundant everywhere.
- Thecla rubi*. Flying round stunted oaks at Penrhyn D. In 1877 and 1878 this insect literally swarmed; last year it was exceedingly scarce.
- T. quercus*. Not uncommon. Abundant on the oak trees in the wood adjoining the Douglas Arms Hotel, Bethesda.
- Polyommatus Phloxæ*. Common wherever I have collected.
- Lycæna Agestis*. Taken in abundance on the Great Orme's Head, by Mr. G. T. Porritt.
- L. Alexis*. Abundant in favourable seasons; not common in 1879.
- L. argiolus*. Llanrwst. vide *Entom.* vol. xi., p. 140.
- Colias Edusa*. Rhyl; rare in clover fields. A beautiful var. *Helice* from Bangor, 1877.
- Gonopteryx rhamni*. Rare.
- Anthocaris cardamines*. Common everywhere.
- Pieris napi*. Common.
- P. rapæ*. Abundant.
- P. brassicæ*. do.
- Hesperia malvæ*. Two specimens, both from Tal-y-cafn (?)
- H. Tages*. Common.
- H. Sylvanus*. Extremely common where it occurs; swarms on the mountain slopes surrounding Festiniog vale.
- A. linea*. This insect used to occur at Barmouth in 1877, but I have never taken it anywhere else. Wilson says, "abundant in Wales."
- I should imagine *C. Davus* occurs in North Wales, as there are very likely spots for it. I came across quite a little colony of *V.*

cardui in the larva and pupa state. The larvæ were feeding upon thistles growing in a sequestered spot formed by the peculiar situation of the rocks. The North Welsh butterflies seem to be very fitful in character, and often disappointing to the collector; but this may be taken for what it is worth, as the past few years have been no criterion for future success.

CONTRIBUTION TO A LIST OF THE DIPTERA OF LANCASHIRE AND CHESHIRE.

(NORTH OF LANCASTER EXCEPTED).

(Continued).

BY BENJN. COOKE.

MUSCIDÆ—continued.

- Cordylura pubera*. Hazelgrove, scarce.
C. albipes and *spinimana*. Manchester.
C. liturata. Manchester; Hazelgrove.
C. obscura. Manchester; Bowdon; Whaleybridge.
Scatophaga stercoraria, *merdaria* and *lutarea*. Common.
Sciomyza fuscipennis and *obtusa*. Manchester, scarce.
S. cinerella. Cheshire coast.
S. nana. Manchester.
S. monilis. Bowdon.
S. nigrimana. Marple.
Helomyza flava. Manchester; Hazelgrove.
H. pallida. Manchester; Bowdon.
Leria serrata. Common.
Dryomyza flaveola. Manchester; Bowdon.
D. præusta. Rivington; Bowdon.
Tetanocera marginata. Southport, scarce.
T. cucullaria and *aratoria*. Manchester; Bowdon.
T. reticulata and *punctata*. Bowdon.
T. sylvatica. Manchester; Bowdon; Hazelgrove.
T. elata. Bowdon; Hazelgrove.
Tetanops myopina. Southport; Cheshire coast.
Sphærocera denticulata and *vaporariorum*. Manchester.
Borborus nitidus. Bowdon.
B. equinus and *ater*. Abundant.
Limosina sylvatica, *limosa*, *arcuata* and *crassimana*. Common.
L. scutellaris. Manchester; Bowdon.

- L. fungicola.* Common.
L. erratica. Cheshire coast.
L. spinipennis. Rivington; Bowdon.
L. ferruginata, nigerrima and tosteræ. Manchester.
Lauxania cylindricus. Rivington; Bowdon; Hazelgrove.
L. lupulina. Manchester; Hazelgrove.
L. aenea. Common.
Lonchæa vaginalis. Manchester; Bowdon.
L. tarsata. Stretford.
Palloptera obsoleta. Hazelgrove; Delamere.
P. inusta. Rivington.
P. arcuata. Manchester; Bowdon.
P. umbellatarum. Manchester.
P. ustulata. Manchester; Rivington.
P. saltuum. Hazelgrove.
P. præcusta. Common.
P. decempunctata. Bowdon.
P. pulchella. Manchester; Bowdon.
Ochthiphila aridella and juncorum. Cheshire coast.
Ortalis crassipennis. Stretford, scarce.
O. cerasi. Southport; Marple.
O. vibrans. Southport; Bowdon; Knutsford; Manchester.
Trypeta heraclei. Southport; Bowdon.
T. cognata. Manchester; Southport.
T. artemisiæ and Toë. Bowdon.
T. sonchi. Southport.
T. arnicæ. Rivington; Southport; Hazelgrove.
T. marginata. Cheshire coast.
T. guttularis. Manchester.
T. irrorata. do.
Sepsis cynipsea. Common.
Nemopoda cylindrica. Common.
Themira putris. do.
T. Leachii. Southport.
Calobata cibaria. Hazelgrove.
C. petronella. Common.
C. ephippium. Manchester; Bowdon.
Micropeza corrigiolata. Manchester; Southport; Bowdon.
Loxocera elongata. Manchester; Bowdon.
Psila fimetaria. Common.
P. pallida. Bowdon.

- P. rosæ*. Common.
Piophila casei. Common.
P. luteata. Manchester; Bowdon.
Meromyza sultatrix. Southport.
M. pratorum. Southport; Cheshire coast.
M. variegata. Hazelgrove; Bowdon.
Chlorops hypostigma. Common.
C. scalaris. Manchester; Southport.
C. nasuta. Manchester; Hazelgrove; Rivington.
C. taeniopus. Manchester; Bowdon.
C. cereris. Manchester.
C. messoria. Manchester; Cheshire coast.
Oscinis cornuta. Bowdon.
O. maura. Manchester; Cheshire coast.
Gymnopa subsultans. Lytham; Bowdon.
Opomyza germinationis and *combinata*. Abundant.
O. florum. Manchester.
O. tripunctata. Manchester; Hazelgrove.
Drosophila cellaris. Manchester; Rivington.
D. fenestrarum. Manchester.
Agromyza nigripes. Common.
A. latipes and *flaveola*. Manchester.
Phytomys lateralis. Bowdon; Hazelgrove.
P. aquifolii. Manchester.
P. obscurella. Manchester; Bowdon.
P. nigra, *notata*, and *terminalis*. Manchester.
Notiphila cinerea. Bowdon; Rivington.
N. calceata. Manchester.
Hydrellia thoracica and *griseola*. Manchester.
Ephydra punctato-nervosa. Southport.
E. littoralis. Hazelgrove.
E. aquila. Bowdon.
E. palustris. Manchester.
E. lutosa. Bowdon.
E. noctula and *fusca*. Manchester.

PHORIDÆ.

- Phora dimidiata* and *fuscipes*. Manchester.
P. rufipes. Abundant.
P. gracilipes and *funebis*. Manchester.
P. pumila. Manchester; Bowdon.

P. aterrima. Rivington ; Bowdon ; Manchester.

P. galeata. Manchester.

HIPPOBOSCIDÆ.

Stenepteryx hirundinis. Liverpool.

PULICIDÆ.

Pulex irritans, *canis*, *gallinæ*, and *felis*. Common.

MYCETOPHILIDÆ.

Mycetophila bimaculata. Manchester.

M. lunata and *fuscicornis*. Manchester.

M. lineola. Manchester ; Rivington.

M. semicineta. Southport ; Rivington.

M. maculosa and *sericea*. Rivington.

M. fasciata. Common.

M. bicolor and *discoidea*. Manchester.

M. sobria. Bowdon.

M. longicornis. Manchester.

M. fungorum and *lateralis*. Common.

M. semifusca and *tarsata*. Rivington.

Leia fascipennis. Manchester ; Hazelgrove ; Rivington.

Boletina dubia. Greenfield.

B. plana. Bowdon.

B. nemoralis. Rivington.

Sciophila hilaris. do.

S. rufilatera. Hazelgrove.

S. hirta. Rivington.

S. ochracea. Manchester.

S. nigra. Rivington.

(To be continued.)

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

ARALIACEÆ.

Hedera Helix, L. Abundant in both counties.

CORNACEÆ.

Cornus sanguinea, L. Frequent in woods and thickets in both counties.

LORANTHACEÆ.

Viscum album, L. (A) On apple trees, Beaumaris, Menai Bridge, &c. ;
(C) Bangor, &c.

CAPRIFOLIACEÆ.

- Adora Moschatellina*, L. Abundant in both counties.
Sambucus nigra, L. Common in both counties.
S. Ebulus, L. (A) Near Beaumaris; (C). Valley near Bethesda, &c.
Viburnum Lantana, L. (C) Near Dixon's Slate Works, Bangor.
V. Opulus, L. (A) Between Llanfaes and Arthur's Round Table, on road side; (C) between Gorad Gyt and George Hotel, Bangor.
Lonicera Periclymenum, L. Common in both counties.
L. Xylosteum. (C) Careg y cigfran, Garth, Bangor. [? introduced.]

RUBIACEÆ.

- Rubia peregrina*, L. (A) Between Garth Ferry and Beaumaris, on road side, &c.; (C) Between Gorad Gyt and George Hotel, Great Ormshead, &c.
Galium cruciatum With. (C) Gloddaeth, Llandudno.
G. verum, L. Abundant in both counties.
G. palustre. L. Frequent in wet places in both counties.
G. uliginosum, L. Frequent in both counties.
G. saxatile, L. Common in both counties.
G. boreale, L. (C) Twll du.
G. aparine, L. Abundant in both counties.
Asperula odorata, L. do.
Sherardia arvensis, L. do.

VALERIANACEÆ.

- Centranthus ruber*, D.C. (A) Between Garth Ferry and Craig y Don, &c.; (C) Cliffs, Great Ormshead, &c.
Valeriana dioica, L. (A) On the banks of Alaw river, near Lleimog Castle, &c.
V. officinalis, L. Frequent in both counties.
V. pyrenaica, L. (C) On road sides by Half-way, Bethesda, also about Pentir.
V. olitoria, Moench. Frequent in both counties.
V. Auricula, D.C. (C) In a field close to the entrance of Gloddaeth woods.

DIPSACEÆ.

- Dipsacus sylvestris*, L. (A) Ceint, near Llangefni, Llanidan, &c.; (C) Great Ormshead, near Gogarth.
Scabiosa succisa, L. Frequent in both counties.
S. columbaria, L. (A) Arthur's Round Table; (C) Great Ormshead, plentiful.
S. arvensis, L. Common in both counties.

COMPOSITÆ.

Eupatorium cannabinum, L. Common in both counties.

Tussillago Farfara, L. Abundant in both counties.

T. Petasites, L. (A) Cadnant, Dingle, &c. (C) near Nant Garth, &c.

(To be continued.)

Short Notes and Queries.

ABUNDANCE OF NIGHTINGALES.—I do not know whether the great quantity of nightingales in the south this year has been generally noticed. During Whitsuntide I was collecting lepidoptera in Chattenden Woods, Kent, and found nightingales, not in twos or threes, but in scores. They were everywhere. Every place containing sufficient trees and underwood seemed to have its pair, and in the wood itself they were on all sides. At night, standing still, half-a-dozen could be heard singing at one time all round one. They sang equally well both night and day. I made Higham head-quarters, and the railway station there is built in an old chalk pit, the floor of the pit occupying perhaps a couple of acres. In this pit were some half-dozen of the melodious songsters, representing, probably, as many pairs, and each having its own particular ground; and although through the centre of the pit ran two sets of rails, and in one part of it four sets, and having the station, goods sheds, and several out-houses, and the trains running through every few minutes, the nightingales seemed as fearless and as much at home as in the heart of the wood. Even when the trains were in the station, and the passengers passing in and out, the birds went on singing without interruption. The pit is grown over with willows, sallows, hawthorns, &c., with a thick undergrowth of lower shrubs and plants, and seemed a perfect paradise for birds; the variety of them was surprising. I was very glad to be told that no one ever thinks of molesting them, and this, no doubt, accounts for their tameness and numbers. Of the lepidoptera taken, I may probably have something to say another time.—GEO. T. PORRITT, Highroyd House, Huddersfield, May, 1880.

CUCKOO NEAR HUDDERSFIELD.—The first cuckoo reported to us as heard in this district was on Sunday, 2nd May, at Clayton West, by Mr. Joseph Armitage, and at Fixby by Mr. J. G. Berry, who reports having also seen the first swallow on same date.—Eds. *Nat.*

ALBINO WEASEL IN YORKSHIRE.—I have just obtained possession, in the flesh, of a pure white weasel (*Mustela vulgaris*), without speck, or even a coloured hair. It was trapped at Snydal, near Normanton.—WM. TALBOT, Wakefield, April 22nd.

Chrysomela fulgida.—In answer to Mr. W. D. Roebuck, who asks on p. 141, vol. v. of the *Naturalist*, April, 1880, for the synonymy of *Chrysomela fulgida* Steph., will you permit me to say that this extremely beautiful local beetle is known in Dr. Sharp's catalogue as *Chrysomela graminis* Linn., Gyll., Suffr., &c. I use the term "local beetle" because

it has been taken alive on tansy, at Wakefield ; and when the portion of the transactions of the Union containing the *Coleoptera* is published, I think it will be found recorded.—E. B. WRIGGLESWORTH, 6, Clarendon Street, College Grove.

A CORRECTION.—The Mickley *Eurynchium striatulum* recorded in the May number of the *Naturalist* is a misnomer. Dr. Spruce does not agree with Mr. Boswell, who thought the Mickley moss to be *striatulum*, but says it is *B. plumosum* var. *major*. I may add that Dr. Spruce throws doubt upon the Lincolnshire *E. striatulum* even being the true plant, but this matter is as yet *sub judice*.—F. A. L., May 4th.

ERRATA ET CORRIGENDA.—In a report of a meeting of the Wakefield Field Naturalists, p. 144, vol. v., *Cedemera cærulea*, Linn., is mentioned as having been captured at Wetherby by Mr. Roebuck. That gentleman has kindly pointed out the error I made as to the locality, which should have been Loversall Quarry, near Doncaster ; and as we all know how very desirable it is to have localities, when given, perfectly accurate, and the above insect not being a plentiful species, I am anxious, for the benefit of your readers who may be concerned, to correct the mistake.—ED. B. WRIGGLESWORTH, Wakefield.

CORRECTION.—I regret that the dried specimen named *Zygodon Nowellii*, exhibited by me at Huddersfield Scientific Club, and reported in last issue, p. 157, was not examined under the microscope previous to its being recorded. A subsequent examination shows it to be only *Barbula recurvifolia*. A note to the same effect has been received from Mr. West, who gathered it, and from Mr. F. A. Lees.—C. P. HOBKIRK.

Rainfall for April.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·87	18	7·92	* 10·55	15	0·47
LEEDS ... (H. Crowther) ...	183	†					
HALIFAX... (F. G. S. Rawson)	360	3·22	18	12·00	11·99	...	...
BARNSELY ... (T. Lister) ...	350	1·81	16	6·33	8·15	15	0·42
INGBIRCHWORTH (do.)	853	2·08	20	10·91	9·91	15	0·60
WENTWORTH CASTLE (do.)...	520	1·95	15	7·30	8·85	13	0·54
GOOLE .. (J. HARRISON) ...	25	1·61	11	5·78	5·74	13	0·46

* This is the average to date for 13 years, 1866-78.

† No returns.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting, May 11th, the president, Mr. T. Lister, in the chair.—Arrangements were made for the Yorkshire Naturalists' Union excursion on June 12th to Barnsley, and the fine woods and parks surrounding it. The dates of spring migrants are nearly filled up, excepting the pied flycatcher. Of all we have noted, most are remarkably early, after an unusually severe season. The additional records are :—house-martin, April 11, goat-sucker, April 19, redstart, April 18, grasshopper-warbler, April 18, whitethroat, April 23, nightingale, April 26, sedge-warbler, April 25, lesser whitethroat, April 29, garden-warbler, April 30, wood-warbler, April 29, black-cap, May 1, sandpiper, May 1, swift, May 14. Of insects observed since last meeting, are, *Eupethecia pusillata*, *Odonoptera bidentata*. A new locality was given by the botanists for *Paris quadrifolia*, more abundant in the limestone than in the coal formation.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Feb. 6th, the president in the chair.—A paper on "Additions to the list of local lepidoptera" was contributed by Mr. Carter. The paper showed that during the past year nineteen species of insects, not previously recorded, had been added to the list.

MEETING, March 2nd, Mr. West, vice-president, in the chair.—Mr. Faull read an interesting paper on "Scale Mosses," which he illustrated by a number of excellent coloured diagrams. Mr. Wardman exhibited *G. vaccinii*, *H. progemaria*, *P. pilosaria*, also a beautiful dark variety of the latter, all from this district. Mr. West showed some of his recent collectings, including *Thuidium abietinum*, from Kirk Deighton ; and the following plants from Malham, *Fontinalis gracilis*, *Bryum roseum*, *Brachythecium rivulare*, *Ulotia intermedia*, *Gymnostomum rupestre*, *Mnium subglobosum*, *Hylocomium squarrosum* (fr.), *Eurhynchium piliferum*, *Hypnum falcatum* var. *virescens*, *Polytrichum strictum*, *Zygodon viridissima*, *Bartramia calcarea*, *Barbula recurvifolia* Schimp., *Cylindrothecium concinnum*, *Funaria calcarea* (fr.), *Trichostomum mutabile*, *Madotheca platyphylla*, *Chiloscyphus polyanthus*, *Endocarpon miniatum*, *Graphis scripta*, *Solorina saccata*, *Zonotrichia calcarea*, and *Calothrix mirabilis*.

MEETING, March 16th, Mr. West, vice-president, in the chair.—A number of botanical and entomological specimens were exhibited, among the latter being a rare variety of *H. leucophearia* from Shipley Glen, shown by Mr. Hodgson. Mr. West gave a short lecture on "Lichens," which was illustrated by a number of specimens.

MEETING, April 6th, the president in the chair.—Mr. Spencer showed a specimen of White's thrush, *Turdus Whitei*, shot in Australia. Mr. Hodgson showed *C. flavicornis*, an almost black *P. pilosaria*, *A. betularia*

(a bred black variety), and *P. multistrigaria*. Mr. Jagger delivered a very interesting lecture on "Climate and its influence on the distribution of animals and plants."

MEETING April 13th, Mr. Illingworth in the chair.—A paper on "Fossils" was read by Mr. H. Hebblethwaite. The essayist showed how, by comparing the qualities and peculiarities of living animals, it was possible to make out the form of the extinct animal from a fossil bone.

MEETING April 27th, the president in the chair.—Mr. Soppitt exhibited *Viola palustris*, var. *sylvatica*, *Cardamine amara*, *Puccinia anemones*, *P. saxifragarum*, *Uredo cirsii*, *Ustilago longissima*, *Æcidium ranunculacearum*, &c. Messrs. Hodgson and Hirst, boxes of local insects, including *T. cruda*, *T. stabilis*, and bred specimens of *N. plecta*, *S. carpinii*, &c. Cocoons and living females of the latter insect were shown by Mr. Illingworth. A short account of a visit paid to the bulb gardens of Holland, was given by Mr. Hebblethwaite.

MEETING, May 11th, the president in the chair.—Mr. West exhibited specimens of *Helleborus viridis*, *Berberis vulgaris*, *Stellaria neglecta*, *Pyrus malus* var. *mitis*, and *Paris quadrifolia*. Mr. Soppitt showed specimens of micro-fungi, including *Urocystis pompholygodes*, *Puccinia umbelliferarum*, *Æcidium valerianacearum*. Mr. Hebblethwaite, a cut specimen of *Saxifraga crassifolia*, and a few dried plants from the north of Italy. Mr. Illingworth gave a short paper on "Elementary Astronomy," and exhibited some instruments used in making observations.—J. A. DOUGLAS, F.R.M.S., &c., &c., Hon. Sec.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, 3rd May, the president in the chair.—B. Garside exhibited male specimen summer duck; F. Lumb eggs of whitethroat and great tit; C. C. Hanson small serpent from Honduras, found in some logwood. A good table of local plants was shown, among which were *Prunus cerasus*, *P. Padus*, *Prunus spinosa*, *Vinca minor*, *Viola palustris*, and *Pedicularis sylvatica*, by G. Fielding and G. Edwards. The latest migrants were given in, sedge warbler, May 2, whinchat, May 2, cornerake, May 10.—W. H. STOTT.

HUDDERSFIELD SCIENTIFIC CLUB.—May meeting, Mr. S. L. Mosley, president, in the chair.—Mr. Geo. Brook exhibited a series of crabs, as follows:—*Grapsus pictus*, *Ocypode cursor*, and *Sesarma tetragona* from Madagascar; *Corystes cassivilaunus* from Weymouth; and *Hyas coarctatus* from Hastings. The chairman showed a fine variety of *Larentia cæsiata*, having the broad central band very dark; it had been taken at Bingley; Mr. G. T. Porritt, *Notodonta chaonia*, bred from larva taken at Edlington Wood on the last August Bank Holiday; also larvæ of *Pterophorus galactodactylus*, riddling from the underside, the leaves of the burdock; they had been sent to him from Bristol. Mr. C. P. Hobkirk, larvæ of a *Tipula*, probably *oleracea*, upon which a conversation took

place as to the best means of destroying them. Mr. Geo. Jarnain gave a most interesting lecture, in which he explained a new system of decimalizing weights, on somewhat the same principle as Messrs. J. J. Griffin and Sons had decimalised the gallon. In illustration he showed a neat series of weights in mahogany box, made to decimals for him by Messrs. Avery of Birmingham. He shewed clearly the immense advantages of using them for weighing different materials, especially from Continental formulæ of dye mixtures, &c. By his method this could be done without the least calculation, whilst now the ordinary English artizan is utterly at a loss to translate these formula into ordinary British weights. We believe Mr. Jarnain proposes shortly to bring the method thoroughly before the public. The last report of the West Kent Natural History Society was laid upon the table.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. —Monthly meeting, April 26th, the president, Mr. S. J. Capper, in the chair.—Mr. Scowcroft, of Ormskirk, read a paper on "Special Adaptions in insect Structures." The paper had special reference to the honey bee, and was illustrated by microscopical preparations.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION. —377th meeting, April 20th, Mr. B. Holgate, F.G.S., president, in the chair.—Eggs of the swan, goose, Canada goose, (Methley Park) eider duck, pochard, scaup, scoter, golden-eye, wild duck, pintail, longtailed duck, garganey, and teal (Adel) were shown by Mr. John Grassham; and of the white-tailed eagle, Egyptian vulture, osprey, honey buzzard, and peregrine falcon, by Mr. Walter Raine. The proposed lists of the fauna and flora of the magnesian limestone district were then gone into at considerable length, and numerous additions reported, the work having been added to by Messrs. W. I. Baynes, of Ulleskelf, and W. J. Milligan, of Wetherby. Desmids were shown by Mr. Barwell Turner, F.C.S., F.R.M.S.; microscopic sections of coal plants by the president; minerals by Mr. H. Marsh; and other objects by various members.

EXCURSION, Saturday, April 24th, was made to Castleford, for the descent of a new coal pit at Briggs' collieries, under the guidance of Mr. Thomas Rees.

378TH MEETING, April 27th, the president in the chair.—Lecture on "The Two Great Limestones of the West Riding of Yorkshire," by Prof. A. H. Green, M.A., F.G.S.

EXCURSION, Saturday, May 1st, made to the neighbourhood of Garforth, chiefly geological in its interest.

379TH MEETING, May 4th, Mr. H. Lupton, president of the Entomological Section, in the chair.—A letter from the Leeds Town Clerk was read, stating that compliance would be made with the Club's request that fishing be suspended in Roundhay Park during the "fence time." An earwig was shown, which infested boxes of Indian cigars at Masham,

sent by Mr. Carter. Mr. Charles Smethurst showed a small *Amphidasis betularia* (Bishop's Wood), a three-winged *Abraxas grossulariata* (bred), *Ephyra punctaria* (bred from Bishop's Wood larvæ), and *Trichiosoma betuleti* and cocoons from Bishop's Wood, where it is abundant. Mr. Henry Marsh showed preserved larvæ, pupæ, and imagos of *Hadena pisi* from Woodhouse Ridge, its parasite and food-plant; also larvæ from Meanwood of *Noctua brunnea*, *N. augur*, and *Boarmia repandata*. Mr. Walter Buckton brought specimens of *Trachea piniperda*, taken this season, near Blackmoor, north of Leeds. Mr. Roebuck, miscellaneous insects, including *Zeuzera æsculi* from Mapplewell, near Barnsley, *Andrena fulva* from Rastrick, *Bombus virginialis* from Wothersome, *Acilius sulcatus* from Askham Bog, and others. Other objects were also on view.

380TH MEETING, May 11th, the president in the chair.—Mr. Washington Teasdale, F.R.M.S., exhibited slides of the crystals he had obtained from different inks in common use; and type slides of allied genera of ferns. Mr. J. W. Dixon, slides of minerals. Mr. W. Barwell Turner, F.C.S., F.R.M.S., fresh-water algæ, including a species new to Yorkshire (probably to England), thought by Dr. M. C. Cooke to be a *Microthamnion*. Mr. James Abbott, the following species from Bramhope:—*Closterium setaceum*, *C. lunula*, *C. moniliferum*, *Pandorina morum*, *Cosmarium tetraphthalinum*, and *Docidium truncatum*; also Entomotraca (*Brachionus* and *Cypris*). Mr. F. Emsley, *Astasia* and *Euglena*. Mr. J. R. Murdoch gave a list of mosses and hepaticæ found about Horsforth; and exhibited *Aulacomnium androgynum* from Madam Wood, collected by Mr. T. Birks, jun.—W. D. R.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, May.—Mr. James Spencer gave a report of the meeting of the Yorkshire Union of Naturalists, held on Easter Monday, at Masham, for the Ripon district, and gave a short account of the geology of that neighbourhood, exhibiting the following fossils from a quarry in the millstone grit rocks, between Fountains Abbey and Brimham:—*Orthis resupinata*, *Productus maritima*, *P. semi-reticulatus*, *Rhynchonella*, *Pleurodon*, and *Bellerophon costatus*, which were only a few of the specimens obtained. Mr. T. Hirst exhibited a pair of French partridges, pair of summer ducks, and pair of teal ducks.

RAMBLE IN THE LUDDENDEN VALLEY.—The members had a ramble through the Luddenden Valley, on 8th May, through Wheatley to Warley Edge, and through Hollins Wood. Owing to the recent cold weather the specimens taken were not numerous, and those only of the commoner species; but the members had a very pleasant and enjoyable excursion.—JOSEPH OGDEN, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—The second meeting of 1880 was held at Malton for the exploration of Castle Howard and Hildenley, on Whit-Monday, the 17th of May, and although not so productive of rarities or novelties as was expected, was an interesting and successful meeting.

The day was brilliantly fine throughout. The greater number of the excursionists alighted at Castle Howard Station, only a few proceeding to Malton to inspect the quarries and other sections which abound in the immediate vicinity. The Castle Howard party split up into several groups, each led by a local gentleman. Capt. Russell was in charge of one party, which proceeded by way of Welburn to Castle Howard, where the house and grounds were inspected and the route afterwards prolonged through the Hildenley Estate, the seat of Sir C. W. Strickland, Bart., the High Sheriff of Yorkshire, to Malton. Sir Charles, who is himself a good geologist and botanist, not only threw open his grounds, but kindly allowed his collection of fossils—a very fine one—to be inspected. The grounds contained some noble specimens of coniferous trees, and Hildenley wood, a patch of old forest ground, contains some rare plants. The other parties, conducted by Messrs. M. B. Slater, H. Hurtley, S. King, and Chadwick, followed a different route to Castle Howard, by way of Gilla Leys, Crambe Beck Stream, and the Ray Wood, collecting by the way. One or two of the botanists made a call upon Dr. Spruce, the eminent bryologist, at his residence at Coneysthorpe. The party which investigated the vicinity of Malton was entirely geological, and was accompanied by Messrs. G. Slater, W. Constable, G. Edson, and others; besides examining the quarries, they had the opportunity of inspecting a collection of fossils, which, contributed by some of the Malton collectors, was laid out in the meeting-room of the Geological Section. All parties made their way to Malton by about four o'clock, when tea was served at the Talbot Hotel. The sectional meetings were much interfered with by the fact that many members, including officers of sections, had to leave by train, about five p.m. The general meeting was held in the large room of the Literary Institute, and was presided over by the new president, Prof. W. C. Williamson, F.R.S., of Manchester, who met with a hearty welcome on being introduced to the meeting by Mr. Thos. Hick, B.A., B.Sc.; the attendance was large, about 70 or 80, including representatives of the Ovenden, Bradford (Naturalists' Society and Scientific Association), Leeds (Naturalists' Club and Conchological Society), York, Huddersfield (Literary and Scientific Society), Driffeld (Literary and Scientific Society), and Dewsbury Naturalists' Societies. A vote of thanks to Capt. Russell, Messrs. H. W. Pearson, Chadwick, Wm. Constable, and E. Barnby of Malton, Mr. T. M. Townsley of Leeds, Mr. J. Bennett of Bradford, Mr. John Braim of Pickering, Mr. J. Whitfield, F.C.S., and Miss Whitfield, of Scarborough, Mr. John Wright of Terrington, and Rev. E. Maule Cole, vicar of Wetwang, for becoming subscribers to the funds, was passed unanimously. On the motion of Mr. J. Thrippleton, seconded by Mr. Thos. Hick, B.A., B.Sc., thanks were voted to Mr. M. B. Slater of Malton, for his services as local secretary; to Capt. Russell, Messrs. W. Constable, H. Hurtley, George Edson, J. Gibson, jun., S. Chadwick, and G. Slater, of Malton, for acting as guides and leaders of parties; to Sir C. W. Strickland, Bart., for permission to visit his grounds; for

similar permission for Castle Howard ; and to the committee of the Literary Institute for use of rooms. Mr. G. T. Porritt, F.L.S., having presented a volume of the Linnean Society's Journal to the library, thanks were voted for this and some pamphlets presented by other members. Mr. Thomas Hick proposed and Mr. W. Prest seconded a resolution that a memorial be drawn up, and signed by the president, congratulating Mr. Darwin upon his having lived long enough to see the twenty-first anniversary of the publication of the "Origin of Species," and to witness the impetus given thereby to the development of biological science. Prof. Williamson, saying that he could not have been more gratified than by such a resolution being proposed on the first occasion on which he occupied the chair, delivered an eloquent tribute to the genius of his friend Mr. Darwin, after which the resolution was passed unanimously. The president, Mr. Hick, and Mr. J. W. Davis were chosen as the sub-committee to draft the memorial, to submit to a future meeting. The president then delivered an address, in which he contrasted the scientific activity of York and the towns on the coast in the days of John Phillips, Wm. Bean, John Williamson and others, with their present inactivity, and hoping that the residents of the North and East Ridings would take up and complete the work begun by their scientific forerunners. The reports of Sections were then taken. Mr. James Spencer, secretary of the Geological Section, having left, his report was taken as read. It stated that Malton is situated on the coralline oolite, which is well exposed in the neighbourhood in quarries and cuttings. The rock is generally a cream-coloured coarse-grained limestone, but varies considerably, sometimes passing into a sandy freestone, used for building purposes, and sometimes becomes very hard and flinty. In a lime quarry at Old Malton were obtained many fossils, including a species of the spiral *Phasionella*, *Cucullæa*, and an ammonite a foot in diameter ; another quarry yielded some fish-teeth, whilst a third, in the drift, chiefly composed of the debris of local rocks, also furnished some travelled boulders. Interbedded with the drift is a bed of pure loamy clay, and in one place, near the surface, what appears to be a lacustrine deposit, with many modern shells. The most interesting object furnished by this quarry was a fine neolithic stone hammer-head, about half-way down the face of the deposit. There can be no doubt of the genuineness of this find, but the peculiarity is its being in a deposit considered to be of Paleolithic age.—The Vertebrate Section was not represented, and the only observations made were of a numerous colony of sand-martins in a quarry near Castle Howard station ; a blindworm and young, noted by Mr. W. Cash, near Castle Howard. The Conchological Section was represented by Mr. W. Cash, F.G.S., president, and Mr. J. Darker Butterell of Beverley, secretary. They reported that 33 species had been observed—nine fluviatile, and 24 land-shells—all of them being of the common types. As, however, very few members of this section were present, and a large district had to be rapidly gone

through, the list may be considered satisfactory ; and there is no doubt that, if energetically worked, the neighbourhood of Malton will prove very productive. Mr. William Prest, of York, reported for the Entomological Section (in the absence of its officers) that the only insects seen at Castle Howard were *Pieris napi*, *Anthocharis cardamines*, *Argynnis Euphrosyne*, *Eupithecia abbreviata*, and *Micropteryx subpurpurella*, the results being otherwise *nil*. Bees were equally scarce. He gave a list of insects which he had taken at Sandburn during the previous day, including *Pieris napi*, *Anthocharis cardamines*, *Ellopiæ fasciaria* (larvæ), *Odontopera bidentata*, *Crocallis elinguaris* (larvæ), *Tephrosia biundularia*, *T. punctulata*, *Macaria liturata*, *Fidonia atomaria*, *Eupithecia lariciata*, *E. albipunctata*, *E. abbreviata*, *Thera variata* (larvæ, pupa and imago), *T. firmaria* (larva), *Melanippe subtristata*, *Anticlea badiata*, *A. derivata*, *Gonoptera libatrix*, *Penthina prælongana*, *Coccyx hyrciniana*, *Incurvaria masculella*, *Micropteryx subpurpurella*, and *Coleophora genistæcolella*. For the Botanical Section Mr. F. Arnold Lees, F.L.S., reported upon the flowering plants seen during the day, stating that—partly owing to the early date of the excursion, and partly to the paucity of collectors present—the number of Phanerogams noted during the day was only 135, a number smaller than usual. Of these only seven were worthy of special mention, viz :—*Ranunculus circinatus* (Hutton Mill) ; *Actæa spicata* (Hildenley Wood) ; *Geranium pyrenaicum* (roadside bank near Coneysthorpe) ; *Cratægus oxyacanthoides*, Thuill. (by Cranbeck Bridge) ; *Myrrhis odorata* (several places), and *Veronica montana* (Gillaleys and Lowdy Hill Gill). Two alien (not native) species were gathered in the woods, much of the younger timber in which has been planted—neither the beech nor the elm having a claim to be styled aboriginal, albeit attaining great perfection at Castle Howard—these two species being *Geranium phæum* and *Sambucus racemosa*, Willd., an early-flowering kind of elder, semi-aborescent, with a globose cyme of yellow-green flowers, and pinnate smooth-stalked leaves composed of five leaflets equal at the base, the berries being red.—Mr. William West reported for the Cryptogamia that the species observed included 60 mosses, the principal of which were *Seligeria pusilla*, *Eucladium verticillatum* (fr.), *Campylopus flexuosus*, *Eurhynchium striatum* (fr.), *Mnium undulatum* (fr.), *Physcomitrium pyriforme* (fr.), *Hypnum Sommerfelti* (fr.), *H. chrysophyllum* ; thirteen Hepaticæ, the rarer of which were *Jungermannia Wilsoniana*, *Cephalozia connivens*, *C. multiflora*, *Calypogeia Sprengellii*, and *Chiloscyphus pallescens* ; about ten species of lichens, mostly common ; 20 species of fungi, among them being *Corticium cœruleum*, *Trichia chrysus*, *Nectria episphæria*, *Sphæria aquila*, *S. acuta*, *Oidium monilioides*, *Pleurotus septicus*, *Nummularia Baillardii*, *Hypoxylon fuscum*, *Puccinia violæ*, *Trichobasis mercurialis*, *Uromyces Ficariæ*, *Æcidium albescens*, *Æ. leucospermum*, *Æ. violæ*, and *Æ. ficariæ*. A number of algæ were collected, the best being a green variety of *Batrachospermum moniliforme*.—W. D. R.

Diary.—Meetings of Societies.

- June 1. Liversedge Naturalists' Society. Bishop Auckland Naturalists'. Leeds Naturalists' Club, &c.—Entomological Section.
- „ 2. Wakefield Naturalists'.
- „ 8. Bradford Naturalists' Society.—“Natural History Observations.”—Mr. Saville. Leeds Naturalists' Club, &c.—Microscopical and Botanical Sections.
- „ 9. York and District Field Naturalists'.
- „ 10. Dewsbury Naturalists'.
- „ 11. Huddersfield Scientific Club.
- „ 12. Yorkshire Naturalists' Union.—Excursion to Barnsley. Local Secretary, Mr. Thomas Lister, Victoria Crescent, Barnsley.
- „ 15. Leeds Naturalists' Club, &c.—“The Distribution of Land Molluscs.” Edwin Atkinson, F.L.S.
- „ 19. North Staffordshire Field Naturalists'.—Excursion to Stone and Bury Bank.
- „ 21. Manchester Cryptogamic.
- „ 22. Bradford Naturalists' Society.—“Coal.”—Mr. Starling. Leeds Naturalists' Club, &c.—Vertebrate Section.
- „ 28. Huddersfield Naturalists'. Lancashire and Cheshire Entomological.
- „ 29. Leeds Naturalists' Club, &c., Entomological Section.

WILL any Botanist meeting with *Potamogetons* or *Charas* during the ensuing season kindly send me fresh or dried specimens, especially if in fruit? I shall be very pleased to send rare Southern, South-eastern, or Eastern flowering plants in exchange, either living or dried.

(*P. crispus*, *densus*, and *polygonifolius* not wanted).—A. B., 107, High Street, Croydon, Surrey.

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PART I. FOR 1877, contains the commencement of “The Birds of Yorkshire,” by Mr. W. E. Clarke; of an “Annotated List of the Land and Fresh-water Mollusca of Yorkshire,” by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on “Yorkshire Macro-lepidoptera in 1877,” by Mr. G. T. Porritt, F.L.S.; one on “Yorkshire Micro-lepidoptera in 1877,” by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on “Yorkshire Diptera,” and on the Yorkshire species of Hemiptera of the Family *Psyllidæ*; and a report on Yorkshire Botany in 1877.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' “Moss-Flora of the East-Riding”; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidæ*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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JULY, 1880.

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(NORTH OF LANCASTER EXCEPTED).

(Concluded).

BY BENJN. COOKE.

MYCETOPHILIDÆ—continued.

- Sciaria Thomae. Manchester; Bowden; Rivington.
S. morio. Manchester; Bowden; Delamere; Southport.
S. pallipes. Bowdon.
S. hyalinipennis. Manchester; Southport.
S. præcox. Southport; Cheshire coast; Hazelgrove.
S. fuscipennis. Southport; Bowdon.
S. scatopsoides, fenestratus, and fucatus. Common.
S. longipes, pusillus, and gracilis. Manchester.
S. flavipes. Rivington.
S. compressa. Manchester.
Lestremia leucophæa and cinerea. Manchester.
Campylomyza bicolor. Manchester; Bowdon.
Platyura vitripennis. Rivington.
P. fasciata. Hazelgrove.
P. flavipes. Manchester; Bowdon.
P. concisa. Manchester.
Macrocera lutea. Manchester; Southport; Bowdon; Rivington.
M. phalerata. Manchester.
M. fasciata. do.
Bolitophila cinerea. Manchester. Bowdon.

RHYPHIDÆ.

- Rhyphus nigricans and cinctus. Common.

BIBIONIDÆ

- Bibio Marci. Common.
B. leucopterus. Bowdon.
B. lanigerus. Common.
B. nigriventris. Bowdon.
B. hybridus. Manchester; Bowdon.
B. nigripes. Manchester.
B. clavipes. Bowdon.
Dilophus spinatus and femoratus. Common.
Scatopse notata. Abundant.

Scatopse clavipes. Manchester.

S. halterata, recurva, and brevicornis. Bowdon.

Aspistes berolinensis. Southport, June, 1879.

SIMULIDÆ.

Simulium reptans. Common.

TIPULIDÆ.

Ctenophora bimaculata. Rivington.

C. atrata. Delamere; Marple.

Ptychoptera albirana. Manchester.

P. contaminata and scutellaris. Manchester; Bowdon.

Tipula lutescens. Manchester; Rivington.

T. gigantea. Manchester; Warrington; Rivington.

T. rufina. Greenfield.

T. hortensis. Abundant.

T. longicornis. Rivington; Hazelgrove.

T. varipennis. Rivington.

T. excisa. Bowdon; Hazelgrove.

T. lateralis. Manchester; Bowdon.

T. marginata. Manchester.

T. vernalis. Manchester; Bowdon.

T. oleracea. Abundant.

T. flavolineata. Rivington.

T. nigra. Southport, rare.

T. pruinosa. Rivington,

T. pagana and lunata. Manchester.

T. ochracea. Southport; Bowdon; Hazelgrove.

T. annulicornis. Bowdon; Warrington.

T. cornicina. Manchester; Southport; Bowdon.

T. quadrifasciaria and scurra. Manchester; Bowdon.

T. flavescens. Common.

T. imperialis. Manchester; Bowdon.

T. crocata. Southport; Bowdon; Hazelgrove; Warrington.

Pedicia rivosa. Rivington; Bowdon.

Dolichopeza chirothecata. Rivington; Delamere.

Rhipidia maculata. Manchester; Bowdon.

Limnobia marmorata. Hyde.

L. discicollis. Manchester.

L. lucorum. Hazelgrove.

L. ferruginea and punctum. Manchester.

L. lineola. Manchester.

- Limnobia nigrina*. Manchester; Warrington; Rivington; Greenfield.
L. punctata. Manchester; Bowdon; Whaley Bridge.
L. leucophæa. Manchester.
L. littoralis. Stalybridge; Marple.
L. errans. Rivington.
L. tripunctata. Hazelgrove.
L. nubeculosa. Rivington; Bowdon.
L. flavipes. Marple.
L. analis. Greenfield.
L. morio. Manchester; Bowdon.
L. oscillans. Rivington.
L. dumetorum. Manchester; Rivington.
L. chorea. Common.
L. lutea. Southport.
L. tenella. Bowdon.
L. finitima and *gracilipes*. Manchester.
L. immaculata. Manchester; Hazelgrove.
L. occulta. Rivington.
L. lateralis. Manchester.
Symplecta stictica. Manchester.
S. punctipennis. Hazelgrove.
Erioptera maculata. Manchester; Bowdon.
E. cinerascens. Manchester.
E. imbuta. Bowdon.
E. flavescens. Manchester; Hazelgrove.
E. lutea. Manchester.
E. lineata. Manchester; Greenfield.
E. trivialis and *tænionata*. Common.
E. varia. Bowdon.
E. fuscipennis. Manchester; Rivington.
E. nodulosa. Manchester; Bowdon.
E. crassipes. Manchester.
E. murina. Bowdon.
Anisomera vittata. Bowdon.
Trichoura hiemalis and *regelationis*. Abundant.
Dixa maculata. Hazelgrove.
Culex annulatus. Common.
C. nemorosus. Manchester.
C. ciliaris. Common.
Anopheles maculipennis. Manchester.
Corethra plumicornis. Manchester; Bowdon.

- Chironomus viridis*, præcox, and prasinus. Manchester.
C. modicellus. Bowdon.
C. affinis. Manchester.
C. maculipennis. Manchester ; Hazelgrove.
C. albimanus. Manchester.
C. pedellus. Whaley Bridge.
C. annularis. Manchester ; Bowdon.
C. obnixus. Rivington.
C. brunnipes. Bowdon.
C. pallens. Common.
C. riparius. Bowdon.
C. psittacinus. Manchester ; Bowdon.
C. flaveolus. Common.
C. virescens. Manchester.
C. malacus. Manchester ; Bowdon ; Hazelgrove.
C. imbecilis. Bowdon.
C. pallidicornis. Manchester.
C. albidus. Manchester ; Rivington ; Bowdon.
C. perennis and *enotatus*. Manchester.
C. plumosus. Common.
C. irretitus. Bowdon.
C. sticticus. Manchester ; Hazelgrove.
C. lucidus. Delamere.
C. carbonarius. Bowdon.
C. morulus. Manchester ; Bowdon.
C. nemoralis. Manchester.
C. zonarius. Bowdon.
C. rufipes. Manchester.
C. intextus. Southport ; Delamere.
C. obvertens. Manchester ; Bowdon.
C. lentulus. Knutsford.
C. dolens. Bowdon, common, but local.
C. nactus. Manchester.
C. effusus. Bowdon.
C. expalans. Manchester ; Bowdon.
C. minuseculus and *interseptus*. Bowdon.
C. obscurus and *paganicus*. Manchester ; Bowdon.
C. novatus. Manchester.
C. stercorarius. Manchester.
C. tremulus. Rivington ; Hyde ; Stalybridge.
C. motitator. Manchester.

- Chironomus sylvestris*. Bowdon.
C. byssinus and *minimus*. Common.
C. obscurimanus. Manchester; Bowdon.
Tanypus varius and *nebulosus*. Common.
T. zonatus. Rivington; Marple.
T. plumipes. Delamere.
T. melanops. Manchester.
Corynoneura atomaria. Manchester.
Ceratopogon pulicaris. Common.
C. nitidus. Hazelgrove.
C. fasciatus and *femoratus*. Manchester.
Cecidomyia salicis and *betulae*. Manchester; Bowdon.
C. fasciata. Rivington.
C. crassipes. Southport.
Orphnephila testacea. Rivington.
Psychoda phalænoides. Abundant.
Pericoma canescens. Rivington.
P. nubila and *fusca*. Manchester; Bowdon.
Ulomyia hirta. Manchester.

MOSSES OF THE WETHERBY DISTRICT,

ADDITIONAL TO DR. WESLEY'S LIST, NAT., SEPT., 1879.

OBSERVED BY

F. ARNOLD LEES, F.L.S.

1. *Sphagnum subsecundum*, Nees. Boggy ditch, Devonshire Wood.
2. *Dicranella rufescens*, Turn. Plumpton grit rocks, near Spofforth.
3. *Dicranum palustre*, Brid. Bleachfield marsh at Aketon.
4. *Pleuridium subulatum*, L. Collingham bank top.

* [*Seligeria subcernua*, Schpr. (*Dicranum cylindricum*) Incognit.
 "Near Wetherby, on a brick wall," Dickson, 1801. I have sought for a *Seligeria* of any kind on the limestone slopes at Wetherby and Thorparch in vain, so far. Old inhabitants know of no brick walls at all near Wetherby, and I have seen none.]

5. *Eucladium verticillatum*, L. Sparingly and barren on wet lime crags above Boston Spa and Thorparch.

* This plant is referred to by Dickson as *Bryum paucifolium*. *Dicranum cylindricum*, Hed., is *Trichodon* (*Ceratodon*) *cylindricus*.

6. *Barbula Hornschuchiana*, Schpr. Wall of manor house garden and elsewhere, but barren.
7. *B. revoluta*, Schwg. Walls, Wetherby, common.
8. *B. tortuosa*, L. On rocks in small quarry near west end of Lund Wood, Rigton Bank top, dwarfed and barren.
9. *B. papillosa*, Wils. Near Wetherby, W. West (1880).
10. *Zygodon viridissimus*, Dicks. On an old tree bole near Cowthorpe Weir, sparingly.
11. *Bartramia pomiformis*, L. On rocky red-grit bank of lane leading from Aketon bleach works to Follifoot.
12. *Philonotis calcarea*. B. & S. Marshy field near St. Francis' Chapel, Stockeld. Mr. Boswell has certified to the name; I passed it as *fontana*.
13. *Webera nutans*, Schreb. Rare about Wetherby, heathy, turfy places being rare, and the soil dry and calcareous. Compton Bank Wood! Cranberry Carr, Hunsingore; and also growing with ling—the only spot on which that survives near Wetherby—on the summit of a large isolated grit boulder by the roadside at St. Francis' Chapel, near Spofforth. On this rock, inaccessible without a ladder, survive other relics of a flora now being gradually displaced by aggressive agriculture.
14. *Bryum atropurpureum*, W. & M. Amongst other mosses on baked calcareous clay soil in a quarry by road near Linton Spring.
15. *Mnium rostratum*, Schrad. Nidd bank at Cowthorpe, and by Crimple Beck at Aketon.
16. *Tetradontium Brownianum*, Dicks. Plumpton Rocks, Rev. T. Dalton in Nowell's *Supp. Flor. Yorks.* (p. 153.) Still there!
17. *Polytrichum gracile*, Menz. On a bank in Cranberry Car, near Hunsingore; capsules five-angled, and calyptra small and pale. Mr. Boswell has certified the name, but yet I have some little doubt whether this be not a small variety of *P. commune*, since the apophysis was distinct, and Mr. Hobkirk found the leaves not to agree with typical *gracile*. Capsules were scarce, so that the plant merits further investigation another season.
18. *Myrinia pulvinata*, Wahl. By the river near Tadcaster—R. Spruce. Tree-boles, Cowthorpe Weir, with *Leskea polycarpa*: the name certified by Mr. Boswell.

[*Thuidium abietinum*, L. Mr. Wesley discovered this, sparingly, in an old limestone quarry at Ingbarrow and Kirk Deighton; since I came to reside at Wetherby I have noticed it in several new localities, in one of which—Jackdaw Crag, near Sutton—it is strange it was not noticed long ago, seeing that that quarry, and the district about, were well worked by Spruce, Ibbotson, and others. This is assuming, of course, that it was there *then*, the contrary hypothesis opening up a wide and interesting inquiry. I, myself, am disposed to believe it may well have originated since, as the locality has altered. We know it is the rule for ground freshly broken up, or turned over, to yield relays of vegetation. Take a railway cutting, for example, and we know that the first year or two its surface is appropriated by coarse annuals, these gradually disappearing and another flora taking their place, these again gradually giving way to a third type of perennials. Why not so with an old quarry? York Minster was partly built of stone quarried from Jackdaw Crag, and most certainly for the first few years subsequent to its being let alone it is not a matter for doubt that the broken ground would yield orchids, gentians, and the usual plants of a recent lime-quarry. Year by year these would grow scarcer, and the rocks slowly become moss-clothed; at first *Hypnum serpens*, *lutescens*, and *chrysophyllum*, with other coarse vigorous species, prevailing; and then others, and, finally, yet others. *Now*, in this quarry, on the weathered and moss-grown rock-faces we have several species of a decidedly montane type, and yet I can find records of none of these latter in the floras of 1840, 1854, and only of one in that of 1862. I may perhaps be pardoned prolonging this digression by proceeding to give illustrations: *Antennaria dioica*, two *Collemas*, *Frullania Tamarisci*, *Thuidium abietinum*, *Cylindrothecium concinnum*, *Tortula tortuosa*, *Neckera crispa*, *Cladonia rangiferina*, and—best example of all—the montane lichen *Endocarpon miniatum* may to-day be found occurring there. The *Endocarpon* occurs nowhere nearer than Malham Cove, and being a slow grower, it must have taken well-nigh a century to clothe the face of the bare vertical rocks in the abundant way it does now.]

19. *Brachythecium albicans*, Neck. Jackson's quarry, Kirk Deighton, and on broken ground in lane west of Lund Wood, near Ripton Bank top.
20. *Eurynchium crassinervium*, Tayl. On wet stones by weir at Thorp-arch.

21. *Plagiothecium sylvaticum*. L. Near Pannal, W. West, *vide* H. Boswell. Wood opposite Woodhall, near Collingham. "Wetherby, Dr. Wesley"—C. P. H., in *Jour. Bot.*, Dec., 1879. I confess to not clearly differentiating this from large, distant-leaved infertile examples of *P. denticulatum* until recently, when I became the recipient of opinions on the matter from Dr. Spruce and Mr. Boswell. Too many moss-lovers, myself amongst them, too often fail to give their first and closest attention to the characters afforded by the inflorescence. *P. sylvaticum* is dioicous; and, apart from its greater rarity than *P. denticulatum*, in consequence fruits less frequently; though when it does, the long rostrate beak of the capsule at once reveals it; but when without inflorescence it is no easy matter to tell one species from the other. Mr. Boswell remarks that "*sylvaticum* may be known by the larger areolæ of the leaves, by their stronger nerves, and (I presume he means when in process of drying) by the shrinking of the foliage," making them look more distant. So far as my observation goes, *P. sylvaticum*, when growing, is of a much deeper, richer green (often with a tinge of golden-brown in it) than its monoicous double, and in drying for the herbarium loses its glossiness, becoming dull and opaque, the leaves disposing themselves naturally in two opposite ranks with a loss of contiguity. *P. denticulatum* varies much, and there is a distant-leaved variety, but has evident complanate leaves inclined to overlap, their edges recurved, and of a paler green, with a high gloss not lost in drying. The dates given in manuals for the fruiting of the respective species need revision. *P. sylvaticum* is said to fruit in autumn, and *denticulatum* in spring; but I have seen not over-ripe capsules of *P. sylvaticum*—as determined by better "authorities" than I lay any claim to be—gathered near here and at Castle Howard in February, April, and May of this year; whilst *P. denticulatum* is in like good condition at the same time about here. It would be more correct to regard both species as summer fruiters, as John Nowell long ago stated.
22. *Hypnum aduncum*, Hedw. (*Kneiffii*, Schimp. Syn.) In plenty in two marshy fields near the cemetery on left of Walton Road, Wetherby. A curious drawn-out form without the strongly-hooked stem and branch apices usual in *Kneiffii*, but with the characteristic enlarged quadrate cells at the decurrent alar angles of the leaves.
23. *H. vallisclausæ*, Schpr. In the water of a rill in rushy field near Stockeld Grange Farm; discovered by Wesley, but not in his list.

24. *H. polymorphum*, Hedw. (*Sommerfelti*, Myr.) In Jackson's quarry, Kirk Deighton, on sloping rock, mixed with *H. chrysophyllum*. On stones in Jackdaw Crag quarry, and in Flint Mill wood. On stones in Collingham wood—W. West! A pretty little moss resembling diminutive *chrysophyllum*, monoicous, with cordate-ovate squarrose nerveless leaves; not new to the Riding, for two records exist of its occurrence long ago to Hooker and Brunton, at Weathercote and Studley, but hitherto overlooked by compilers, since it is not given either in Carrington's List in 1862, or Hobkirk's in *Jour. Bot.* (1873 and 1879). Mr. Slater informs me he has long known it about Malton, chiefly on small stones in woods, often growing with *H. serpens*. It is a species which pre-eminently illustrates the need of a complete descriptive moss-flora for the county or riding, which, by painstaking consultation of public herbaria, and the framing of concise differential diagnoses, shall be exhaustive of old records, faithfully reflective of recent progress, and a finger-post facilitative of future discovery.

The twenty-four additions to Mr. Wesley's List here enumerated raise the total number of species known to occur within four miles of Wetherby to 146—*i.e.* about 25 per cent. of the known British species. The district shows up badly in the genera *Sphagnum*, *Campylopus*, *Grimmia*, and *Bryum*, but must, nevertheless, be considered peculiarly rich for an area with little bog and no mountainous tract within its limits.

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

COMPOSITE—continued.

Aster Tripolium, L. (A) near Llandisilio Church, &c.; (C) Between Llandudno Junction and Tal y Cafn, &c.

Erigeron acris. (A) Near Penmon.

Chrysocoma Lynosiris, L. (C) Great Ormshead, abundantly, south-east side, also near Deganwy. Flowers in September.

Solidago Virga-aurea, L. Abundant in both counties.

Inula Helenium. L. (A) On road side near Llanallgo Church.

I. crithmoides. L. Along the south-west coast of Anglesea, in many places.

I. dysenterica, L. Abundant in both counties.

I. Conyza, D. C. (A) Between Garth Ferry and Beaumaris; (C) Nantporth, Bangor.

Bellis perennis, L. Abundant in both counties.

Chrysanthemum Leucanthemum, L. Abundant in both counties.

C. segetum, L. Frequent in cornfields in both counties.

C. Parthenium, Pers. (A) Near Garth Ferry, &c. (C) Portdinarwic Quay.

C. inodorum L. Common in both counties.

Matricaria Chamomilla, L. Not uncommon in both counties.

Anthemis Cotula, L. Frequent in both counties.

A. nobilis. (A) Near Penmon, &c.

Achillea Ptarmica, L. Common in both counties.

A. millefolium. Abundant in both counties.

[*Dietis maritima*, Coss. Said to have been found under Llanfaelog Church, Anglesea. I have searched the ground indicated above, in 1879, but could not find a trace of it.]

Tanacetum vulgare, L. (A) Llwydiart mountain and near Llanddona Church; (C) Near Deganwy, &c.

Artemisia maritima, L. (A) Near Boduon.

A. maritima var. *β. gallica*. (A) Between Penrhyn, Aberffraw, and Llangwyfan Church.

A. vulgaris, L. Common in both counties.

A. Absinthium, L. Not uncommon about old cottages in both counties.

Gnaphalium dioicum, L. (A) Arthur's Round Table; (C) Great Ormshead, on the top, &c.

G. uliginosum, L. Common in both counties.

Filago germanica, Willd. Common in both counties.

F. minima, Fries. (C) Under Aber, near the river.

Senecio vulgaris, L. Abundant in both counties.

S. viscosus, L. (C) Great Ormshead.

S. sylvaticus, L. Common in both counties.

S. aquaticus, Huds. Common in wet places in both counties.

S. Jacobæa, L. Abundant in both counties.

S. erucifolius, L. (A) Lleiniog Castle; (C) about Llandudno.

S. campestris, D.C., var. *maritimus*, Syme. (A) Porthpistill, near Southstack, Holyhead; flowers in June.

Bidens cernua, L. Frequent in both counties.

B. tripartita, L. Do. do.

Arctium Lappa, L. Abundant in both counties.

Serratula tinctoria, L. Common in both counties.

- Saussurea alpina*, L.C. (C) Snowdon, and rocks above Idwal Lake.
- Carduus Marianus*, L. (A) Near Penmon; (C) Great Ormshead, &c.
- C. nutans*, L. (A) Between Llanfaelog Church and the sea.
- C. acanthoides*, L. (A) Penmon, &c.; (C) Great Ormshead.
- C. tenuiflorus*, Curt. (A) Between Beaumaris and Penmon, &c.; (C) Port Penrhyn.
- C. lanceolatus*, L. Common in both counties.
- C. palustris*, L. Abundant in both counties; in Cwm Idwal with white flowers.
- C. arvensis*, Curt. Abundant in both counties.
- Onopordum Acanthium*, L. (C) Great Ormshead, near Gogarth Abbey.
- Carlina vulgaris*, L. Common in both counties.
- Centaurea nigra*, L. Abundant in both counties.
- C. cyanus*, L. Frequent in cornfields in both counties.
- Helminthia echinoides*, Gaert. (A) Penmon, &c.; (C) Great Ormshead.
- Leontodon hispidus*, L. Abundant in both counties.
- L. autumnalis*, L. Common in both counties.
- L. hirtus*, L. Frequent in both counties.
- Hypochaeris maculata*. (C) Great Ormshead, south side; flowers June and July.
- Lactuca muralis*, Fresen. On walls, Bettws-y-coed, and about Aber.
- Sonchus arvensis*, L. Abundant in both counties.
- S. oleraceus*, L. Do. do.
- Taraxacum officinale*, Wigg. Common in both counties.
- T. officinale*, var. *a Dens-leonis*. Frequent in both counties.
- var. *β erythrospermum*. On Upper Garth Road, Bangor.
- var. *δ palustre*. Frequent in both counties.
- Crepis virens*, L. Abundant in both counties.
- C. paludosa*, Moench. (C) Cwm Idwal, rare.
- C. taraxacifolia*. (C) Near Llyn cwn.
- Hieracium Pilosella*, L. Abundant in both counties.
- H. alpinum*, L. (C) Rocks above Twll du; Glydr Fawr, &c.
- H. murorum*, L. (C) Frequent about Bangor.
- H. pallidum*, Fries. (C) Great Ormshead.
- H. argenteum*, Fries. (C) Rocks above Llanberis.
- H. umbellatum*, Lin. Frequent in both counties.
- H. coeius*, var. *cambricum* V. (C) Great Ormshead; flowers in July.
- CAMPANULACEÆ.
- Lobelia Dortmanna*, L. (A) Maelog Lake, &c.; (C) Ogwen and Idwal Lake, &c.

Jasione montana. Frequent in both counties.

Campanula rapunculoides, L. (C) Bangor, Caemaesyglodig.

C. rotundifolia, L. Common in both counties.

C. hederacea, L. (C) Banks of Ogwen Lake, and near Llandegai.

(To be continued.)

Short Notes and Queries.

CORRECTION OF A CORRECTION.—A further and ampler specimen of the Hypnoid moss (alluded to in the last number of the *Naturalist*) having been sent me by Dr. Lees, affords greater facility for study. It possesses one capsule with the operculum thereon, which being conical and not beaked, shows it to belong to *Brachythecium*, and not to *Eurynchium*; but as the nerve or midrib of the leaf extends to the apex, it must be referred to *B. populeum*, not *plumosum*, in which latter the nerve ceases about the middle of the leaf. The plant, after all, appears to be *B. populeum*, var. *majus*, as to which vide "Schimper's Synopsis." The seta is so slightly rough, that at a first glance it seems smooth. All this offers one more proof of the need for extreme caution in giving names to small and imperfect specimens of mosses, for they are very likely to mislead even a practised observer. No such specimen should be considered safe, if it belongs to an intricate group, till it has been remanded for a time, and brought up for a second examination, when it will often be found that some important point was overlooked at first. As Wilson used to say, "we do not at all times see the same thing with the same eyes." Austin states that *B. populeum* "plainly passes into *plumosum*," and in uniting the two he is followed by some other American writers; but we may demand more proof of its correctness before accepting this dictum as final. I, at least, have seen no intermediate links.—H. BOSWELL.

V. C-album IN NORTH WALES.—I am surprised to find that Mr. Bairstow's List of the Butterflies of North Wales does not include *V. C-album*. I saw a few specimens of this butterfly last year, in the neighbourhood of Bont-d-dhu and Hendreforion, near Barmouth. With the exception of *Cardui*, *C-album* was the only species of the genus which I observed in Merionethshire or Denbighshire in the course of three weeks.—H. Goss, Surbiton Hill, Surrey.

Sesia sphegiformis, &c.—Pupæ of this rare clearwing were collected not uncommonly in Tilgate Forest during Whitsuntide. At the end of May, too, *Meliana flammea* was taken rather freely at Wicken Fen.—G. T. P.

REVIEW.—"The British Moss Flora.—Fam. I., Andreaeaceæ: By R. Braithwaite, M.D., F.L.S., London, of the Author, 303, Clapham Road.—The first part of this work (referred to on page 156) is now in our hands, and the few remarks we have already made respecting it are more than realised. The engraver has reproduced the drawings most accurately and neatly, and in a style which it would be almost impossible to

surpass. The letter-press is full and complete, the definitions ample, and the synonymy under each species has been most carefully and exhaustively worked up. It is a boon to every lover of mosses.—Eds *Nat.*

Rainfall for May.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·84	10	10·76	* 12·12	26	1·26
LEEDS ... (H. Crowther) ...	183	†					
HALIFAX... (F. G. S. Rawson)	360	3·20	11	15·20	13·51	...	...
BARNSELY ... (T. Lister) ...	350	2·72	14	9·05	10·33	26	1·55
INGBIRCHWORTH (do.)	853	3·22	14	14·13	12·46	26	1·46
WENTWORTH CASTLE (do.)...	520	2·66	11	9·96	10·02	26	1·43
GOOLE ... (J. HARRISON) ...	25	1·79	10	7·57	8·22	26	1·00

* This is the average to date for 13 years, 1866-78.

† No returns.

Reports of Societies.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, Monday, June 7th, the president in the chair.—A good table of local plants was shown, among which were *Silene inflata*, *Lysimachia nemorum*, *Spergularia rubra*, *Spergula arvensis*, *Botrychium lunaria*, *Ophioglossum vulgatum*, also *Mertensia maritima*, and *Cotyledon umbilicus* from North Wales. F. Lumb shewed eggs of ringdove and lesser redpoll. B. Garside, land rail. F. Hollingworth, several entomological specimens under the microscope.—W. H. STOTT.

HUDDERSFIELD NATURALISTS' SOCIETY.—Fortnightly meeting, June 12, the president (Mr. J. Varley) in the chair.—The tables were well covered with specimens, the naming and discussion of which occupied the whole evening. In botany the specimens were very numerous, brought chiefly by Mr. Varley from the neighbourhood of the Eden, in Cumberland, and by Mr. Fisher, from Kirkburton. The following, among others, were noticed:—*Orchis Morio*, *Trifolium filiforme*, *Geum rivale*, *Geranium molle*, *Hottonia palustris* and *Ranunculus aquatilis*. Conchology was represented by *Helix hispida* and *Clausilia rugosa*. In entomology Mr. Ellis showed a few choice moths, and Mr. Varley some fine insects from Cumberland. GEO. WILKINSON, Hon. Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting May 31st, the president, Mr. S. J. Capper, in the chair.—Some

notes communicated by Mr. Moore, of the Museum, who had received them from Mr. Dunkenfield Jones, and illustrated by original diagrams, were read, and referred to the metamorphoses of the lepidoptera of Brazil, which group of insects Mr. Jones is studying at San Paulo. The Rev. H. H. Higgins introduced the result of some recent investigations into the causes of the persistent dissimilarity between the vernal and autumnal broods of the same insects, with special reference to the well-known continental examples of *Lerema* and *Prorsa*. Investigation was invited into the common English double-brooded forms of *Napi* and *Rape*, as being likely to throw considerable light upon the origin and genesis of all our lepidopterous insects, and would be regarded with much interest. The usual conversazione terminated the meeting, during the course of which the following exhibits were made :—*Platycodon bifasciatum*, by Mr. W. Gardner ; *Acherontia Atropos*, by Mr. E. D. Fish ; *Cucullia chamomilla*, by Mr. Dixon.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—381st meeting, May 25th, Mr. W. E. Clarke in the chair. Cases of birds exhibited for Mr. W. J. Milligan, of Wetherby, included a pair of pintail ducks, and a pair of teal from Hornby decoy ; an artistically mounted pair of wrens and nest ; and a supposed Hampshire specimen of the American hawk owl. The existence, in captivity, of a dormouse, taken in a hollow tree in Meanwood Park, was mentioned. Microscopic objects were shown by Mr. F. Emsley ; and Mr. Jas. Abbott brought the results of his excursion same day in neighbourhood of York, including *Hydrocharis morsus-ranæ*, *Utricularia minor*, *Orchis Morio*, *Myrica Gale*, *Hottonia palustris*, *Carex paradoxa*, *Riccia natans*, *Volvox globator*, &c.

382nd MEETING, June 1st, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. W. H. Taylor showed larvæ of *Agrotis agathina*, pupa of *Smerinthus populi*, *Panorpa communis* (?), and several examples of *Saperda populnea*, taken in aspen, all at Meanwood. Mr. Geo. Tyers brought *Satyrus Aegeria*, *Emmelesia decolorata*, *Cidaria suffumata*, *C. russata*, *Eupithecia lariciata*, *Abraxas ulmata*, and dark variety of *Tephrosia binodularia*, from Wentbridge ; and various lepidoptera taken at Civita Vecchia. Mr. Charles Smethurst showed *Anticlea derivata* and *Eupithecia lariciata* from Huddlestons, and other insects. Mr. H. Marsh, *Eurymene dolabraria* and other lepidoptera, *Carabus nitens*, *Ctenicercus pectinicornis*, and other beetles from Windermere and other parts of the Lake district. Mr. Walter Raine showed some insects, also skins of the fieldfare and redwing from Ryther, and eggs of the same birds from Norway. On behalf of Mr. Carter, of Masham, were shown fragments of large cockroaches, found in boxes of cigars imported from India.

383rd MEETING, June 8th, the president in the chair.—Mr. F. Arnold Lees submitted a list of the plants found on the magnesian limestone tract, with preliminary remarks, including 1186 species. Mr. C.

Smethurst showed a number of shells and insects from the same district. Microscopical and botanical exhibits were also made.

384TH MEETING, June 15th, the president in the chair.—Mr. Edwd. Atkinson, F.L.S. gave a lecture on "The Distribution of Land Mollusks," showing part of his collection of shells in illustration.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, June 2nd, the president, Mr. J. Wainwright, in the chair.—Mr. H. Sims showed bred specimens of *P. falcata*, *N. cucullina*, *C. fluctuosa*, *S. certata*, *O. bidentata*, and *C. corylata*; also larvæ of *D. templi*, and *T. opima*. Mr. Wright, larva of *D. templi* and imago of *T. biundularia*; Mr. Spurling, *Charadrius pluvialis*, in summer plumage, captured in the neighbourhood; Mr. J. W. Shaw, several botanical specimens and *Bombus muscorum*, *B. fragrans*, *B. lapidarius*, *Apathus campestris*, *Andrena albicans*, and *Nomada alternata*, &c.—J. W. SHAW, Corr. Sec.

YORKSHIRE NATURALISTS' UNION.—The third meeting of 1880 was held at Barnsley on the 12th June. Three parties were organised by Mr. Thomas Lister, the local secretary. One under his own guidance proceeded by way of Keresforth to Wentworth Castle and Stainborough Park, Rockley, Worsbro' Reservoir, and back through Locke Park. A second party led by Mr. John Harrison, went through Old Mill, by Burton Grange Abbey, along the Dearne valley, past the Sewage Farm to Storr Mill, and thence to New Park Spring, returning to Cudworth station in time for the 4-50 train to Barnsley. A third party, in charge by Mr. John Hutchinson, visited Cannon Hall, Deffer, Hugsett and Silkstone Fall Woods. All the meetings were held at the Queen's Hotel. The Rev. W. Fowler, M.A., presided at the general meeting, at which the attendance was about 60 or 70. Fifteen societies were represented. The list of new subscribers, to whom thanks were voted, included Messrs. John Wright of Terrington, W. Porter of Goole, A. Russell Coning and G. Colby of Malton, Jas. Keely of Whitby, F. W. Dowker of Helmsley, G. A. Griffiths and James Fox of Barnsley, and F. W. T. Vernon Wentworth, of Wentworth Castle, and a donation of £1 from Mr. M. B. Slater of Malton. Thanks were voted, on motion of Mr. C. P. Hobkirk, F.L.S., seconded by Mr. William Talbot, to Mr. Thomas Lister for his services as local secretary, and to the Barnsley members who assisted him by conducting parties; also to Messrs. F. W. T. Vernon Wentworth, Thomas Vernon Wentworth, Charles Newman, R. Micklethwaite, Henry Briggs, Joseph Mitchell, — Wilmot, W. T. W. Spencer-Stanhope, and S. Tomlinson, for permission to visit the estates over which they had control. The sectional reports were then given as follows:—For Vertebrate Zoology Mr. Thomas Lister stated the birds observed were—20 migrants, including tree-pipit, whitethroat, lesser whitethroat, grasshopper warbler, blackcap and garden-warbler, redstart, grey flycatcher, night-jar, wheatear, chaffinch, Ray's wagtail, all the swallow tribe, martin, sand-martin, swift, swallow, whinchat, land-rail, willow-warbler,

and sedge-warbler. Thirty-six residents, comprising most of the thrush bunting, and linnet families known to Yorkshire (except the winter visitors), were noted, and comprised the missel and song thrush, black-bird, green and grey linnet, lesser redpoll, magpie, daw, ringdove, stockdove, yellow, blackheaded and corn buntings, great tit, marsh tit, blue tit, chaffinch, bullfinch, starling, meadow pipit, pied wagtail, wren, great-spotted woodpecker, kingfisher, tree sparrow, skylark, lapwing, moorhen, coot, Canadian goose, &c. The Conchological Section was not represented, though the shells collected by other members included unusually fine examples of *Succinea putris* taken at Storr Mill. Messrs. G. T. Porritt and John Harrison reported, for Entomological Section, that the lepidopterists had done tolerably well, Messrs. W. Brady, C. W. Richardson, W. Berry, and others having taken about 24 species. Nearly all the collecting was done in New Park Spring Woods, and *Melanippe hastata* was found there in abundance, with *Asthena sylvata*, *Melanthia albicillata*, a very dark form of *Cidaria russata*, *Tephrosia biundularia*, &c., &c. Mr. John Harrison reported that *M. hastata* and *A. sylvata* were also both very common at Edlington Wood, near Selby, this year. Mr. C. P. Hobkirk, F.L.S., reported, for the Botanical Section, that 159 vascular plants had been seen, the following being the best :—*Ranunculus Lenormandi*, *Spergularia rubra*, *Rosa mollissima*, *R. arvensis*, *Campanula latifolia*, *Lamium Galeobdolon*, *Alopecurus agrestis*, and *Orchis Morio* ; fifteen mosses, including *Aulacomnion androgynum* and *Brachythecium plumosum* ; six hepaticæ, amongst them being *Chiloscyphus polyanthus*, *Jungermannia bicuspidata*, and *Calypogeia trichomanes* ; four species of fungi—*Stereum hirsutum*, *Hypholoma fascicularis*, *Stropharia semi-orbicularis*, and *Sphæria acuta* ; three common lichens, and 18 algæ, including *Gomphonema constrictum*, *Meridion circulare*, *Melosira varians*, *Ædogonium vesicatum*, and *Mougeottia genuflexa*. No botanist accompanied the Dearne Valley party, hence possibly the paucity of plants. Mr. Jas. Spencer reported for the Geological Section as follows : Barnsley is situated on the middle coal-measures, and yields the usual coal-measure fossils—*Stigmaria*, *Sigillaria*, *Lepidodendra*, *Calamites*, *Sternbergia*, *Dadoxylon*, *Asterophyllites*, *Pecopteris*, *Neuropteris*, &c., together with *Anthracosia*, *Spirorbis*, and fish-scales and teeth. The museum of the Barnsley Naturalists' Society contains a good series of the above genera ; also a splendid specimen of the rare fossil *Limulus*, or king-crab, and a very fine specimen of the sandstone cast of a *Lepidodendron*, which is about 5ft. in length, dividing into two branches about the middle. The main stem is about 1ft., and the branches about 6in. in diameter. It is one of the forms commonly called *Knorria taxina*, but Prof. Williamson (our president) has shown that *Knorria taxina* is only one of the different states of preservation in which the *Lepidodendron* occurs, being a *Lepidodendron* divested of its outer cortical layer.

Y. N. U.

BOSTON SPA MEETING.

This Meeting has been obliged to be **POSTPONED** at the last moment owing to circumstances over which the local Secretaries had no control. It will probably be held either on the 14th or 17th July, of which due notice will be given.

TO OUR SUBSCRIBERS.

A circular has been issued to all members of Y. N. U., intimating our intention to issue 24 pages in each monthly part, commencing with our new volume (1st August)—provided 200 or 250 additional subscribers can be added to our list. This will materially increase the usefulness of the "*NATURALIST*," and we therefore ask each subscriber to get at least one friend to add his name to our list, which should be sent in to us not later than 14th July. The price will remain the same viz :—4/- per annum payable in advance, but this can only be done by the increase named. Will each subscriber do his best to advance this project?—*Eds. Nat.*

Diary.—Meetings of Societies.

- July 6. Leeds Naturalists' Club, &c.: Microscopical and Botanical Section.
Liversedge Naturalists. Bishop Auckland Naturalists' Field Club.
- " 7. Wakefield Naturalists'.
- " 8. Dewsbury Naturalists'.
- " 9. Huddersfield Scientific Club.
- " 10. " Naturalists'.
- " 13. Leeds Naturalists' Club, &c.: Vertebrate and Entomological Sections.
- " 14. York and District Field Naturalists'.
- " 16 & 17. North Staffordshire Field Naturalists'.—Excursion to Coventry, Kenilworth, &c.
- " 14 or 17. Yorkshire Naturalists' Union.—Excursion to Boston Spa, Local Secs., Mr. F. A. Lees, F.L.S., Wetherby, and Mr. J. Emmett, Boston Spa.
- " 19. Manchester Cryptogamic.
- " 20. Leeds Naturalists' Club, &c.
- " 24. Local Naturalists' Association; Excursion to Water Clough Valley, Brighouse.
- " 26. Huddersfield Naturalists'. Paper, "Birds, their General Structure and Character," Mr. James Varley. Lancashire and Cheshire Entomological.
- " 27. Leeds Naturalists' Club, &c., Botanical Section.

WILL any Botanist meeting with *Potamogetons* or *Charas* during the ensuing season kindly send me fresh or dried specimens, especially if in fruit? I shall be very pleased to send rare Southern, South-eastern, or Eastern flowering plants in exchange, either living or dried.

(*P. crispus*, *densus*, and *polygonifolius* not wanted).—A. B., 107, High Street, Croyden, Surrey.

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of "The Birds of Yorkshire," by Mr. W. E. Clarke; of an "Annotated List of the Land and Fresh-water Mollusca of Yorkshire," by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on "Yorkshire Macro-lepidoptera in 1877," by Mr. G. T. Porritt, F.L.S.; one on "Yorkshire Micro-lepidoptera in 1877," by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on "Yorkshire Diptera," and on the Yorkshire species of Hemiptera of the Family *Psyllidae*; and a report on Yorkshire Botany in 1877.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding"; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LXI.

AUGUST, 1880.

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Original Articles.

THE RISE OF THE LITERATURE OF ENTOMOLOGY.

BY WILLOUGHBY GARDNER.

*(Read before the Lancashire and Cheshire Entomological Society,
April 5th, 1880.)*

THE old book I have laid on the table is, as you will see, an early work on Entomology, and indeed it is the very first work ever published on all orders of insects, as a separate volume.¹ It was printed at London in the reign of Charles I., A.D. 1634—two hundred and forty-six years ago. Although I call it the first important book on Entomology, it must not be supposed that I mean that there was nothing written about insects previous to this book. The fact is, several works prior to this treated of insects amongst other things, but were not devoted entirely to them; others, again, were published wholly devoted to certain species, such as hive bees, silk worms, &c.; but this was the first book which treated of Entomology exclusively, and which described all orders of insects.

I now propose to give the results of a few notes I have been collecting for some time past, on the rise of Entomological Literature, hoping to shew its progress from the first notices we find of insects, till it arrived at the dignity of a whole Latin folio volume to itself.

Entomology is, comparatively speaking, a young science, not esteemed of much consequence till, we may almost say, the commencement of the present century. Botany, no doubt on account of its close connection with medicine; and mineralogy, linked as it was with chemistry (whose great theme was to find out the far-famed "philosopher's stone," which was to turn everything it touched into gold) were both studied all through the middle ages, while hardly anyone took any notice of Natural History, including Entomology; consequently no books treating of insects are to be found. But as there is an exception to every rule, so we find some few men turning their attention to Nature, and even noticing insects briefly in their works, though their ideas were necessarily very vague, and many of their opinions exceedingly erroneous. We may even go back past the middle ages—past the Roman era—to that great age of arts, sciences, and literature—the Grecian, to find the first notice of insects recorded. We cannot now tell who was the first man the world saw who condescended to observe and write about insects; but this we do

N. S., VOL. VI.—AUG., 1880.

(1) *Insectorum sive Minimorum Animalium Theatrum*. Olim ab Edvardo Wottono, Conrado Gesnero, Thomaque Pennio inchoatum. Tandem Tho. Moufeti Londinatis operâ sumptibusq. Maximis concinnatum, auctum perfectum, etc. etc. Londini, 1634.

know, that Aristotle, who wrote more than three centuries before the Christian era, took a great deal of his information from previous observers, whose names have perished, but some of whose observations are included in Aristotle's works; therefore we must rest content to know that some naturalists did exist so far back in time, but we can only commence our list of names with ARISTOTLE, the tutor of Alexander the Great, who was born in Greece, B.C. 384. This great philosopher and naturalist wrote, among many other works, a "History of Animals," in which he includes all that was then known relative to the history of insects. He is reported to have written this book at the express desire of Alexander the Great, who encouraged and supported him in a truly royal manner; for he not only supplied him with money for the undertaking to the amount of 800 talents, but in his Asiatic expedition employed above 1000 men to collect animals, which were carefully transmitted to the philosopher!

Aristotle in his "History" describes the habits of those species of insects most generally known; among Lepidoptera he notices the various kinds of *Tineæ*, feeding on wool, fur, books, &c., and one on honeycomb—no doubt *Galleria cerella*; and he also relates how butterflies are produced from caterpillars. Among the Hymenoptera he gives the mode of life and economy of the honey bee, the wild bee, the humble bee, the wasp, the hornet, and the ant; other insects he describes are the grasshopper and the locust. Aristotle does not in his work draw up in a tabular form any classification of insects, but from his writings we are enabled to gather that he divided them by what is called the wing system, making two primary divisions, the winged and the wingless, and subdividing the former into six, and the latter into two families. From all this it will be seen that Aristotle without doubt paid some attention to the insect world; and though he did certainly entertain some very curious ideas on the subject, he was not so ignorant of the truth as is generally supposed. We shall all have often come across Aristotle's theory of the generation of flies, set forth as a sample of his entomological knowledge. He says:—"Flies spring from dead animals of their own accord"—a popular error even at the present day, though more than 2100 years have passed away since Aristotle wrote it; and further, that the flies inherit the nature of the animals from which they spring. Thus, a lion will produce fierce flies which will attack and sting, while inoffensive flies spring from domesticated and peacefully inclined animals! I think all will see that this is not at all a fair example to quote, after the list of insects I have given above

whose life histories he sketches fairly correctly, and that Aristotle's entomological knowledge has been greatly maligned.

Passing from the Greeks to the Romans, the name of **PLINY THE ELDER** figures as the great naturalist historian. He was a very ardent student of Nature, and wrote several books on Natural History, one of which (No. 11) is divided into 23 articles devoted to insects, which however treat chiefly on bees ; these he holds as his fixed opinion spring from certain flowers. Pliny met with his death during the eruption of Mount Vesuvius, which destroyed Pompeii A.D. 79.

VIRGIL, the great Latin elegiac poet, also wrote on bees, devoting the whole of the fourth book of the *Georgics* to their economy. Concerning their origin he says :

“ From herbs and fragrant flowers
They cull their young.”

—an idea much more poetical than correct.

Beyond these two writers—with the exception perhaps of **COLUMELLA**, who is supposed to have lived in the first century, and who in his work on Agriculture devotes some attention to bees, no further notice was taken of insects during the Roman era. After the decline of the Roman empire all literature fell to a low ebb in Europe, and, excepting by **ÆLIAN**, Natural History was unnoticed and unthought of for a long period. **ÆLIAN**, a doctor, was born in Greece in the twelfth century, and wrote a “ Natural History of Animals,” in twenty-seven books, containing a short account of insects, which, however, did not put forth anything new, merely quoting the opinions of Aristotle and Pliny. Thus we may leap over a very long period, extending from the first to the fifteenth century—1500 years—without finding anything new added to the history of Entomology.

With the revival of learning, however, towards the end of the middle ages, a few persons resumed the pursuit of Natural History. Among these the foremost was **CONRAD GESNER**, a man born of poor parents at Zurich, A.D. 1516, but who seems to have been the most apt and indefatigable of men. His various biographers are full of admiration for his personal qualities, and his learning in all branches seems to have been, as Hallam says, “ simply prodigious.” The same author speaks of him as “ probably the most comprehensive scholar of his age.” Gesner wrote on many subjects, yet his fame rests chiefly on his almost incredible achievements in Natural History, on which he wrote many volumes, all illustrated by thousands of figures drawn by his own hand from specimens in his collection, or executed under his own eye by his assistants. His museum of animals, plants, fossils,

&c., brought visitors from all parts, and his correspondence was carried on with the learned men of every nation. When we consider that he accomplished all this while obtaining his living as a medical man, that he was always of delicate health, and died under fifty years of age, his achievements seem truly wonderful. He died in the scene of his many laborious studies, amongst the objects he had spent his lifetime in collecting—being carried at his own request to a couch prepared for him in his museum. Gesner's "Natural History" contained all that was previously known relative to the history of animals; he filled up many gaps by his own personal observations, and thus completed five large folios with merely the Natural History of the Vertebrata; before he reached the Invertebrata, however, death carried him off, A.D. 1565. Our poor insects were not destined to come to the front just yet, for Gesner's posthumous papers on the subject fell into the hands of the well-known Joachim Kamerarius, with whom we leave them for the present.

About this time several other books on Natural History and Botany were published, one or two of which contained some slight notices bearing on the objects of our study.

The various books in which we may look with hope of success for any mention of insects may be, for convenience, classed under the following heads:—1st, Medical works; 2nd, General histories of various countries, including books of travel; 3rd, Works on Natural History generally; and lastly, books on certain species of insects, conspicuous for their utility or otherwise. Under the first head—medical—we find many writers noticing insects briefly, mostly however in connection with their injurious effects on the bodies which they wound or sting, and the remedies for such attacks; and many insects were also then used in medicine. Chief among such works is the "Materia Medica" of DIOSCORIDES of Anazarba, the first printed edition of whose works was not, however, published till Conrad Gesner edited it at Frankfort A.D. 1549.² Then followed MATHIOLI's "Materia Medica," first published in fol. at Venice, A.D. 1554. This great Italian physician was much prone to credulity, yet his work was of long reputation. Also in JODOC WILLICH's "Anatomie,"³ published in the same year, we find a dialogue on locusts.

In the next class, including general histories of countries and books of travel, we find the works of the great doctor and

(2) Another edition in 8vo, Parisiis, 1549.

(3) Dialogus de Locustis in his Anatomie, 8vo, Argent., 1544.

naturalist, PIERRE BELON, who published a book at Paris A.D. 1554, "On many singularities and notable things found in Greece"⁴; and, three years afterwards, a volume—"Portraits of Animals and Birds of Arabia and Egypt,"⁵—both of which describe the most remarkable insects of the countries of which they respectively treat. Gesner has been called the "compiler," and Belon the "observer" of nature; the latter certainly, by his laborious research, made many additions to Zoology. He went on an expedition to the Levant, on purpose to collect specimens there.

(To be continued.)

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

ERICACEÆ.

Vaccinium Myrtillus, L. (A) Near Menai Bridge; (C) common about Bangor, &c.

V. Oxycoccus, L. Not uncommon in both counties in bogs.

V. Vitis-Idæa. (C) Snowdon, &c.

Erica vulgaris, L. Abundant in both counties.

E. cinerea, L. Do. do.

E. Tetralix. L. Common in both counties.

PRIMULACEÆ.

Hottonia palustris, L. (A) Cors ddygai, plentiful.

Primula veris, L. Abundant in both counties.

P. vulgaris, Huds. Do. do.

Lysimachia vulgaris, L. (A) Near Bodorgan Station, &c.

L. nummularia, L. (C) Near Chapel Cerrig.

L. nemorum, L. (A) Cadnant Dingle, &c.; (C) Bangor, Penrhyn Park, &c.

Glaux maritima, L. Common along the coast of both counties.

Anagallis arvensis, L. Abundant in both counties.

A. tenella, L. Common on wet mossy banks and bogs in both counties.

Samolus Valerandi, L. Common along the coast of both counties.

LENTIBULARIACEÆ.

Pinguicula vulgaris, L. Abundant in bogs and wet places in both counties.

(4) Observations de plusieurs Singularités et Choses mémorables trouvées en Grèce, Asie, Indée, Egypte, Arabie et autres pays estranges—in 4to, Paris, 1554; in 8vo, Anvers, 1558: in 8vo, 1589 (woodcuts).

(5) Portraits d'Oiseaux, Animaux, etc., d'Arabie et d'Egyte, in 4to, Paris. 1557 (woodcuts); another edit. 1618.

Utricularia vulgaris, L. Not uncommon in pools and ditches in both counties.

U. minor. (A) Cors hendre, near Pentraeth.

AQUIFOLIACEÆ.

Ilex aquifolia, L. Abundant in both counties.

JASMINACEÆ.

Fraxinus excelsior, L. Common in both counties.

Ligustrum vulgare, L. Do. do.

APOCYNACEÆ.

Vinca major, L. Not uncommon in woods in both counties.

V. minor, L. Not uncommon about old cottages, &c., in both counties.

GENTIANACEÆ.

Erythræa Centaurium, Pers. Common in both counties.

E. littoralis, Fries. (A) Twynn, Aberffraw, &c.; (C) Llandudno, &c.

Gentiana Pneumonanthe, L. (A) Rhos y meirch, near Llangefni, &c.

G. Amarella, L. (C) Between Gorad Gyt and George Hotel, Bangor.

G. campestris, L. (A) Near Arthur's Round Table, &c.; (C) Great Ormshead, &c.

Chlora perfoliata, L. (C) Near Bodafon, Llandudno, very sparingly, 1879.

Menyanthes trifoliata, L. Common in all bogs and shallow pools in both counties.

CONVOLVULACÆ.

Convolvulus arvensis, L. Common in both counties.

C. sepium, L. Abundant in both counties.

C. Soldanella, L. (A) Towyn Capel, near Holyhead, &c.; (C) Llandudno, &c.

Cuscuta epilinum, Weihe. (A) I have seen it growing on flax on Ty Croes Farm, Llangainwen.

BORAGINACEÆ.

Echium vulgare, L. (C) Cae Coch, Bangor, Great Ormshead, &c.

Pulmonaria officinalis, L. Frequent in cottage gardens in both counties.

Mertensia maritima, Don. (A) Cemlyn Bay, north end; (C) near Llynnog.

Lithospermum officinale, L. (A) Near Llanddyfnan; (C) Nantporth, Bangor, Llandudno.

Myosotis palustris, With. Common in wet ditches in both counties.

M. arvensis, Roth. Common in both counties.

M. versicolor. Pers. Do. do.

Anchusa sempervirens, L. (A) Tros yr Afon, Beaumaris; (C) Near Garth Ferry, Bangor.

Lycopsis arvensis, L. (A) Llanddwyn, &c.; (C) Llandudno, &c.

Symphytum officinale, L. Frequent in cottage gardens in both counties.

Borago officinalis, L. Do. do. do.

Asperugo procumbens, L. (C) Great Ormshead.

Cynoglossum officinale, L. Abundant in both counties.

SOLANACEÆ.

Hyoscyamus niger, L. (A) Llanfaelog, Penmon, &c.; (C) Great Ormshead, between Aber and Llanfairfechan, &c.

Solanum Dulcamara, L. Frequent in both counties.

OROBANCHACEÆ.

Orobanche major, L. (C) Nant maes ceirchen, and the hills above the Bangor station, on furze.

Orobanche Hederæ, Duby. (A) Arthur's Round Table, &c.; (C) Great Ormshead, Conway, &c, on ivy.

SCROPHULARIACEÆ.

Verbascum Thapsus, L. (A) Near the beach between Llanidan and Moel y don, &c.; Gogarth, Great Ormshead, &c.

Antirrhinum majus, L. Frequent on old walls, &c., in both counties.

Linaria vulgaris, Moench. Abundant in both counties.

L. Cymbalaria. (A) Abundant above Llangefni, Beaumaris, &c.; (C) common about Bangor.

Scrophularia nodosa, L. Common in both counties.

S. aquatica, L. (A) Cadnant dingle, also near the beach.

S. vernalis, L. (C) Hedges between Llandudno and Conway; Gloddaeth.

Mimulus luteus, Willd. (C) Banks of Ogwen river in Penrhyn park, and Felyn esgob, Bangor.

Digitalis purpurea, L. Abundant in both counties.

Veronica hybrida. (C) Great Ormshead, south of old copper mines, Gloddaeth, &c.

V. serpyllifolia, L. Common in both counties.

V. officinalis, L. Do. do.

V. Anagallis, L. Frequent in both counties.

V. Beccabunga, L. Abundant in both counties.

V. scutellata, L. Frequent in both counties.

V. montana, L. Not uncommon in both counties.

V. chamædrys, L. Abundant in both counties.

V. hederæfolia, L. Do. do.

V. agrestis, L. Do. do.

V. arvensis, L. Abundant in both counties.

Bartsia Odontites, Huds. Do. do.

Euphrasia officinalis, L. Do. do.

Rhinanthus Crista-galli, L. Do. do.

Pedicularis palustris, L. Common in wet marshes, &c., in both counties.

P. sylvatica, L. Common in both counties.

Melampyrum pratense, L. Frequent in both counties.

(To be continued.)

Short Notes and Queries.

THE SUN FISH.—A very fine specimen of this was taken off Brighton, recently, and is now exhibiting in the porpoise tank in the Aquarium. It measures between 4ft. and 5ft. in length, and weighs nearly 2 cwt.

THE GREAT AUK.—Two eggs of the great auk, not previously recorded, discovered in an old private collection in Edinburgh, were sold by auction recently, by Mr. J. C. Stevens, of King-street, Covent-garden, one fetching 100, and the other 102 guineas.

DR. SCHIMPER'S HERBARIUM.—We understand the Baroness Burdett-Coutts has purchased the whole of the Cryptogamic Herbarium, and the numerous MS. notes, &c., respecting the specimens, from the executors, and has presented them to the Royal Herbarium at Kew. We heartily congratulate the Kew officials upon this most valuable acquisition.

Apatura Iris.—Last month I had the pleasure of seeing a nice lot of fine healthy larvæ of *Apatura Iris*, beaten out of sallows in the New Forest, by a friend: and another lepidopterist also showed me a few he had beaten out in Monk's Wood.—G. T. PORRITT, July 9th, 1880.

Lobophora viretata IN SUTTON PARK, BIRMINGHAM.—During a short stay at Sutton Coldfield, a fortnight or more ago, whilst collecting, I captured some pretty little Geometers, which, not knowing better, I designated as *L. olivata*, though with a strong feeling of indecision in my mind. They were at rest on the trunks of fir trees. In all these specimens, however, the beautiful azure green bloom upon the wings was very conspicuous. I sauntered leisurely up a grassy lane bisecting the wood, and there, squatting on some railings, was a similar insect, marvellously dissimilar. My doubts were removed. Never having captured this truly "yellow-barred Brindle," and not having one in my collection, I had still a hovering idea as to its identity, and numerical position in Newman. On my return home, Mr. Porritt pronounced the insect to be *L. viretata*. I took quite a dozen first-class specimens, which were soon dispersed amongst Yorkshire moth-men. One word as to the relative value of Sutton Woods to entomologists. The district is a first-class hunting ground, but I suppose on Whit-Monday some 15,000 to 20,000 excursionists would be

dispersed through the Forest. The result is obvious—insect depopulation! I saw dozens of *L. argiolus* (which swarms at Sutton) dying and dead, slaughtered by the ruthless “billycocks” of tourists. The woods are free to all comers; why not reserve a few plantations of this vast acreage in the interests of Natural Science? The undergrowth is not very rich within the woods, but it is widely different to what we find in the north. I found over 30 pupæ by digging, but sugar proved a failure, only one moth *G. libatrix*, being attracted by the intoxicant. I took a very nice series of *E. lariciata* on the wing, and some curious dark *T. crepuscularia* amongst other things.—S. D. BAIRSTOW, Huddersfield, 7th June, 1880.

Notodonta dictæoides NEAR BARNSELY.—Whilst collecting on the evening of the 21st June last, in Lunn Wood, about three miles from here, I secured a specimen of *Notodonta dictæoides*. The moth, which is a fine male, was taken at rest on the shooting-box.—WM. E. BRADY, 1, Queen-street, Barnsley.

YORKSHIRE COLEOPTERA.—I shall be grateful to any reader of your valuable magazine who will at any time furnish me with specimens of beetles, or notes of captures in Yorkshire, for the benefit of the members of the Yorkshire Union of Naturalists, and the better improvement of the “Transactions” of that body.—E. B. WRIGGLESWORTH, 6, Herbert’s Terrace, Thornes, near Wakefield.

Tortula squarrosa IN DERBYSHIRE.—Being engaged on a list of Derbyshire mosses, I am much pleased to be able to add the above rare moss to the list. I gathered the plant a few weeks back near Bakewell, and am inclined to believe that it has not hitherto been found so far north. Of course it is barren, as usual. I enclose a specimen.—JOHN WHITEHEAD, Dukinfield, 22nd June, 1880.

THE MASHAM “*Hypnum striatulum*.”—If Dr. Lees had correctly copied the name for this moss, as given him by Dr. Spruce, viz., *Hypnum populeum*, β *major* of Wilson’s “Bryol. Brit.,” there would have been no need for Mr. Boswell’s “Correction of a correction” (*Naturalist*, July, 1880), for there was no mention whatever of *Hypnum plumosum*. The moss was gathered by myself and Dr. Lees in Mickley Wood, near Masham, on the occasion of the Easter Monday meeting of the Naturalists’ Union, and Dr. Spruce’s note on my fresh specimens is as follows:—“The moss you send from Mickley Wood is neither more nor less than *Hypnum populeum*, β *major*; it has the monoicous inflorescence, the slightly scabrous pedicel, the nerve running quite to the end of the slender serrulate leaf-point, &c., of that species.”—MATTHEW B. SLATER, Malton, 20th July, 1880.

REMARKABLE FUNGOID GROWTH.—About a week ago I saw several mushrooms growing out of the joints of a stone wall at Horbury, some 7ft. from the ground; one that I brought away with me was well formed and about two inches in diameter. This wall had, about eight or nine

years ago, formed one side of a stable, but since that time has been utilised as a fence wall to divide two properties. Taking it for granted that the spawn had its origin at the level of stable floor, say eight years ago, I think it a notable instance of the tenacity of life the spawn must possess, and very remarkable that it should have worked its way for 7ft. through the hard mortar before showing signs of maturity.—C. W. RICHARDSON, Wakefield, 10th July, 1880.

Rainfall for June.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 2·88	20	13·64	* 14·51	24	0·64
HALIFAX... (F. G. S. Rawson)	360	3·40	21	18·60	19·69	...	...
BARNSELY ... (T. Lister) ...	350	3·77	17	12·82	14·81	22	0·92
INGBIRCHWORTH (do.)	853	4·51	17	18·64	17·54	22	1·14
WENTWORTH CASTLE (do.)...	520	3·80	16	13·76	15·04	24	0·95
GOOLE ... (J. HARRISON) ...	25	4·25	16	11·82	11·25	24	2·42

* This is the average to date for 14 years, 1866-79.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting, July 6th.—The entomological section reported about 50 species of moths and butterflies, some of which, being comparatively rare, were exhibited. Gulls had been seen as early as May 20; stragglers generally appear after the breeding season; two were seen by Mr. W. J. Dandison flying over his house June 19: Mr. T. Lister observed on July 12 four large gulls wheeling about over Cockerham-road, finally disappearing northwards. Three common terns were reported by Mr. E. Hailstone, over Walton Lake, May 28. It is singular that these sea-birds have been reported by him in three different months this year—January, April, and May. Four dotterels were shot on the neighbouring moors early in July; they evidently breed in these parts. A heron was seen flying over the Dearne valley to south-west July 10. Two hawfinches had been received by Mr. Lister from T. Dymond, Esq., Burntwood Hall, May 26—another among many instances of their breeding in this part of Yorkshire. Three pairs of nightingales are reported near Wentbridge; this, with those between Ryhill and Nostell, and at New Park Spring, make five pairs. The cuckoo sang distinctly on July 9. During the Barnsley Naturalists'

excursion to Edlington Wood July 12, many birds were noted—as the lullfinch, great spotted woodpecker, carrion crow, magpie, and jay,—all scarce, from persecution by gun and snare.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, July 5th, the president in the chair.—A good display of the local flora included *Solanum Dulcamara*, *Geum urbanum*, *Valeriana officinalis*, *Corydalis claviculata*, &c. Mr. C. C. Hanson showed the following eggs : razor bill, herring gull, oyster catcher, great black-backed gull, and shag. Mr. B. Garside, brood of young lapwings.—WM. HY. STOTT.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting 12th July, Mr. J. Varley in the chair.—Some very good botanical specimens were exhibited, principally by Mr. J. Armitage, who named them : *Dianthus deltoides*, *Lychnis vespertina*, *Helianthemum vulgare*, *Geranium lucidum*, *Alchemilla alpina*, *Anchusa sempervirens*, and *Lathyrus pratensis*. In geology Mr. Jno. Varley sent several teeth of an extinct species of shark, ventriculites, &c., from the Suffolk crag. Mr. J. Robinson gave a short paper, entitled “Popular errors of the people in respect of Natural History subjects,” saying that ignorance had long fostered beliefs that were at entire variance with the truths of Nature. He showed living specimens of the ringed snake (*Natrix torquata*), the common toad (*Bufo vulgaris*), the common frog (*Rana temporaria*), and the green tree frog—all of which reptiles have been persecuted almost to extermination in some parts of the country. Yet each of these had its use, and by their destruction man destroyed that balance in nature which was so essential to the welfare of both the animal and the vegetable kingdom. Several of the feathered tribe had been held in abhorrence by farmers and others for centuries, as the rook and magpie. While in some instances these had been known to do injury to the growing crops, he maintained that the good done by the destruction of worms, grubs, &c., was of inestimably greater value.—GEO. WILKINSON, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—385th meeting, June 22nd, the president, Mr. B. Holgate, F.G.S., in chair.—A petition to Parliament was adopted, praying that hawks and owls be protected by law. A note from Mr. H. Pocklington, F.R.M.S., on the breeding of siskins in captivity—an unusual thing—was read. Mr. W. Raine gave an account of the nesting of the blackheaded gull at Riccall Common. Mr. A. P. Dobson exhibited a fine *Sinodendron cylindricum* from Studley ; Mr. Roebuck, *Rhagium inquisitor* from New Park Spring, *Plusia chrysitis*, *Xylophasia rurea* and other insects from Weeton. The eggs and a juvenile larva of *Attacus Atlas* were shown by Mr. Henry Marsh. The fly orchis, gathered at Burton Leonard limekilns by Mr. C. Blenckhorn, was shown on his behalf. Mr. J. R. Murdoch showed the rare *Malva borealis* from Sussex. Various botanical, geological and microscopical exhibits were made by him, Mr. George Dobson, Mr. Jas. Abbott, and Mr. W. Barwell Turner, F.C.S.

386TH MEETING, June 29th, Mr. Henry Lupton, M.E.S., in chair.—He showed a small collection of preserved larvæ. Mr. Chas. Smethurst. *Tephrosia crepuscularia* from Scholes, and *Melanthia albicillata*, *Melanippe hastata*, *M. tristata*, *Cidaria corylata*, *Lomaspilis marginata*, *Venusia cambricaria*, *Larentia pectinitaria*, *Coremia munitata*, and *Cymatophora fluctuosa*, all from Wharnccliffe Wood. Mr. Henry Marsh, Meanwood specimens of *Noctua brunnea*, *N. augur*, *N. festiva*, *Aplecta nebulosa*, and *Odontopera bidentata*; also *Euplexia lucipara* from Adel, and *Zygæna filipendulæ* from Grange; also *Apodonta cygnea* from Roundhay. Mr. H. Pocklington, F.R.M.S., an egg of the siskin, laid in captivity. Mr. W. Raine, a living specimen of the kestrel, about six weeks old, from Ryther.

387TH MEETING, July 6th, the president in the chair.—Mr. Pocklington showed “strobic circles” illustrative of the theory and persistence of vision; also sections of part of Cleopatra’s Needle, of *Eozoon canadense*, diatoms from London clay, larva of Colorado beetle, and numerous other microscopical slides, anatomical and otherwise. Mr. B. Saynor, *Actinosphæra*; and other microscopic objects were shown by Messrs. F. Emsley and J. Abbott, and insects by Messrs. J. R. Murdoch and W. Raine.

388TH MEETING, July 13th, the president in the chair.—Mr. John Kirby showed a specimen of Indian shrew known by the name of “musk rat” (*Sorex indica*) and described its habit and odoriferous properties from personal observation at Kurrachee. Bird-skins collected in Eastern and Central Africa by the late Rev. W. Dodgshun, a former member, were shown. Mr. W. B. Turner, F.C.S., F.R.M.S., showed slides of the male gnat (*Culex pipiens*), the marsh fly (*Tetanocera aratoria*), and the sheep tick (*Melophagus ovinus*). Common local insects were shown by various members. Mr. W. H. Taylor exhibited a branch of aspen, showing the mode of life of *Saperda populnea*; also a full-grown larva of *Bryophila perla*, which he had found “feeding on the stone wall” of Roundhay Park, and straightway took into custody for damage to Corporation property.

LEEDS GEOLOGICAL ASSOCIATION.—On June 19th an excursion was made in connection with the Society to Guiseley, under the leadership of Mr. W. Cheetham, v.p. On arrival at Guiseley, a heavy thunderstorm prevented immediate action, but when it had somewhat abated the party proceeded to investigate the various geological features of the district. In a sandstone quarry at Esholt Springs the strata were noticed to be very much broken and shattered in consequence of the close proximity of a fault, a good section of which is exhibited in the railway cutting a few yards beyond, having a down-throw to the north—the rough rock, or millstone grit, being faulted against the Halifax soft coal bed. Near Esholt Junction another fault is recognised, having a downfall to the south. The whole line of fault is consequently what is termed a “trough fault.” At the sandstone quarry before mentioned, near Esholt Springs, large concretionary masses are exhibited in the face of the rock. In places

where the strata are much broken, and there has been a passage for water to force its way through them, this is not an unusual occurrence. A portion of the rock here also contains deep impressions of some kinds of fruit which have the effect of causing it to split into laminæ or flags. The stone obtained in this quarry is only fit for paving purposes. The strata at the Guiseley end of the Esholt railway tunnel are composed of shales and coal seams, whilst at the Bradford end (a distance of about a quarter of a mile only) they consist of Haslingdon flagstones, and dip towards the entrance of the tunnel. The top of the tunnel is capped with rough rock or millstone grit, beneath which is the Haslingdon flagstone. A search amongst the material taken out in the excavation of this tunnel yielded several fair specimens of *Goniatites*. It might be worthy of remark here, that when the tunnel was being excavated, a large quantity of ice-scratched stones were observed, some of them having apparently travelled a great distance. In the railway between Guiseley and Shipley, the 36yds. band coal four inches thick was observed.—H. POLLARD, Hon. Sec.—Philosophical Hall, Leeds.

MANCHESTER CRYPTOGAMIC SOCIETY.—The monthly meeting on the 21st June proved more than usually interesting, on account of the numerous and interesting species of mosses laid upon the table, for the most part recently collected at Malham and Littondale, in Yorkshire, by Mr. Cunliffe. Amongst them were fine fruiting examples of *Cinclidium stygium*, which Mr. Cunliffe distributed. There were also recently collected specimens from that botanical paradise, Miller's Dale, which would be too numerous to name in a brief report, but amongst them may be mentioned the minute *Seligeria pusilla* and *S. acutifolia*, and *Gymnostomum tortile*, *G. microstomum*, and *Anomodon viticulosus*, all in fruiting condition. But the rarest and most interesting species was the *Seligeria tristicha*, which had been discovered growing there in May by Mr. Cunliffe, this being only the second recorded locality in England. The specimens exhibited by Mr. Cunliffe were in fine condition, and mounted for microscopic examination in his well-known style; and the members present congratulated him on finding so rare a moss in a district so well worked as Miller's Dale. Mr. Percival reported that the ground where he and the honorary secretary some few years ago had found fruiting specimens of the very rare British moss *Bryum neodamense*, at Southport, had now become quite grown over with other species, and this moss was nearly extinct. Mr. Percival, however, brought away specimens of *Mnium affine*, var. *elodes*, growing near the same place. Mr. John Whitehead, the late president of the Society, having resigned, it was suggested by Mr. Thomas Brittain, vice-president (who was in the chair) that Dr. B. Carrington should be invited to take the office of president. This was cordially accepted by Dr. Carrington, who was unanimously elected accordingly, and read from the chair an interesting memoir of the life of Mr. Coe F. Austin, the eminent American bryolo-

gist, who died in March last, after having made known and added about 180 new species of mosses and hepatics to the American flora. It was suggested that at some future time Dr. Carrington's memoir of Mr. Austin's life might be printed in full.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, 5th June, Mr. T. Scott, v.p., in the chair.—The following botanical specimens, collected during the day in the Shibden valley, were exhibited :—*Stellaria media*, *Myosotis palustris*, *Caltha palustris*, *Myrrhis odorata*, *Pedicularis sylvatica*, *Lysimachia vulgaris*, *Viola palustris*, and *Paris quadrifolia*; of ferns, *Polypodium vulgare* and *P. phegopteris*.

MEETING July 3rd, Mr. Scott, v.p., in the chair.—During the day the members had a ramble, but owing to the unsettled state of the weather, few botanical specimens were obtained, those gathered being *Veronica montana*, *Lotus corniculatus*, and *Trientalis europea*; of mosses, *Tortula muralis*, *Thamnium alopecurum*, *Didymodon rubellus*, *Bryum nutans*, and *B. capillare*. Mr. T. Hirst exhibited the scarlet ibis, bee eaters, and a case containing the male and female of the summer duck, and teal.—J. OGDEN, Sec.

YORKSHIRE NATURALISTS' UNION.—The fourth meeting for 1880 was held at Boston Spa, on July 14th. The weather was very unfavourable, and, in consequence, but a part of the programme as to conducted parties, &c., outlined in the unusually full circular issued could be carried out. Seven adventurous bryologists, guided by Dr. Lees, nevertheless visited Aketon Bog near Spofforth, and St. Helen's and Jackson's quarries near Deighton, at the cost of a thorough drenching; and Mr. J. Emmett drove a small party to Bramham Park, but had to leave Jackdaw Crag and Black Fen unvisited. Some microscopists walked from Thorner by way of Terry Lug, Wothersome Pool, and the Bramham Park fish-ponds—in one of these, *Volvox globator* being found by Mr. Emsley, the discovery of the day, and probably the only gathering of any rarity resulting from the excursion, which was not mentioned in the circular as already known for the district. At five o'clock, at the Royal Hotel, after tea, the sectional consultations were held, followed at six o'clock by the general meeting, which, in the absence of Prof. Williamson, was presided over by Dr. Lees, F.L.S. Only nine societies had representatives present. The business before the meeting was lengthier than usual, and it is to be regretted that perfect unanimity did not prevail. Thanks for new subscriptions from the Rev. J. Challoner, Messrs. Ormerod, Hugh, Gill, and others, having been given, the customary vote to the gentlemen (Col. Holden and Geo. Lane Fox, Esq.,) who gave permission for their estates to be traversed, was unanimously accorded; coupled with which were similar acknowledgments for the services of the local secretaries, whose good intentions were rendered impossible of performance by the heavy rain. No district could well be richer in interest to the naturalist, nor better repay a second visit from the Union under happier circum-

tances. The chairman read an interesting communication from the Rev. J. Challoner, relative mainly to ornithology, and specially to a duck of his that had recently assumed the plumage and colouring of a drake—a mallard: an occurrence almost unique, or at least much rarer than the contrary change. He also drew attention to the fact that seams of copper had been found in a quarry near Newton, hæmatite iron at Collingham, and some curious elliptic-ovoid stones (pyritic?) in the bed of the Wharfe at Woodhall. On the motion of Mr. Roebuck, seconded by Mr. Clarke, the fungus foray contemplated for next October was postponed indefinitely, after various expressions of regret, and a suggestion from Mr. Cheesman that the Market-Weighton field day be given up instead, on an explanation by Mr. Roebuck that funds were insufficient for the purpose of a seventh (supplementary) and more-than-ordinarily costly meeting, unless indeed the "Transactions" (which it is the grand feature of the Union to furnish the subscribers with yearly) were to be curtailed—a very undesirable alternative. The next business on the paper concerned the memorial address to Dr. Charles Darwin, F.R.S., proposed and carried at the Malton meeting, and to draw up which a sub-committee was then and there appointed. A draft drawn up by himself, Prof. Williamson, and Mr. J. W. Davis, was then read by Mr. Thomas Hick, B.A., B. Sc., and presented to the meeting for endorsement. Its adoption was proposed by Mr. Slater, and seconded by Mr. West. An amendment proposing to postpone consideration of the question, on the ground of the meeting being a small and therefore somewhat unrepresentative one, was lost upon a point of order, the Malton meeting having decided unanimously that an address should be presented. An amendment involving a rejection of the draft, was next moved by Mr. Emmet, seconded by Mr. Gill, and supported by the Rev. W. Fowler, M.A., mainly upon the objection that, whilst all members of the Union must necessarily have the highest admiration of Dr. Darwin's talents as a naturalist, some of them could not accept his conclusions as regarded his "evolution" theory; and, further, that to present a complimentary address to any one for such a special work as the "Origin of Species," involving acceptance of the teachings formulated, was beyond the province of a Union composed of working Naturalists holding diverse opinions, bonded together for a specific purpose alone, viz.—the investigation of facts in local Natural History. With respect to whether or not the adoption of the address pledged the Union to endorsement of the Darwinian view of bio-genesis, &c., the Rev. W. Fowler, M.A., remarked that he freely admitted the felicitous wording and altogether admirable character of the address, viewed from the standpoint of those who believed in the doctrine enunciated by Dr. Darwin; but that he, for one, dissented wholly from the conclusions of which he held the address approved by its eulogy; and to congratulate an author on the fact of a certain work having attained its majority, and placed its argument on a permanent scientific basis—if that basis were dissented from—seemed but

a poor compliment. Mr. Emmet's amendment was, however, lost, several members not voting; and the original motion that the address as drafted be endorsed, was put to the meeting and carried. The time left for making sectional reports was now limited, and such as were presented were very brief. The weather had alike prevented attendance and hindered investigation. No Geological Report was made, and, beyond viewing the upper limestone and Plumpton grit in juxtaposition at St. Helen's quarry, little had been seen. The Entomological tale was soon told: a few "blues" (*Polyommatus alexis*) and a five-spot burnet (*Z. Loniceræ*), none the better for their bath, seen at rest upon grass culms, and a few common *Geometræ* disturbed from the bushes, made a miserable total that afforded no index of the insect productions of the district. Neither the president nor secretary of the Conchological Section was present, but *Succinea putris*, *Pisidium cinereum*, *Planorbis spirorbis*, and *Clausilia rugosa* were reported, amongst others, as having been gathered. For the Botanical Section Dr. Lees observed that only a portion of the route it had been planned to travel had been actually traversed. Amongst plants (not localised in the circular) at present blooming in the district may be mentioned *Hyoscyamus niger* (Collingham), *Orobanche minor* (Collingham bank), *Scirpus multicaulis* (White Carr wood), *Glyceria plicata* (bog below Etchell Crags), *Verbena officinalis* (Wetherby), *Rhamnus Frangula* (Moss Carrs and Wharton Spring wood), and *Epichloe typhina* (Aketon Bog)—the last a well-named microscopic fungus infesting grass sheaths, and mimicking on a small scale the reedmace of our ponds. Mr. Slater reported having seen several rare mosses; the localities of all, however, have already appeared in the *Naturalist*. Amongst the liverworts, *Scapania nemorosa* and *Jungermannia affinis*, Wilson (*turbinata* Raddi), had been gathered in Jackson's quarry, Deighton. Of algæ, *Volvox globator*, *Chroolepus aureum*, *Nostoc commune*, and *Lemania fluviatilis* were the chief species observed. Altogether, unpropitious as the elements proved, 362 species of plants were registered: 280 phanerogams and vasculares, 56 mosses, 8 hepaticæ, 8 lichens, 4 fungi, and 6 algæ. For Vertebrate Zoology Mr. Clarke reported that not alone from the conformation of the district, but also from certain information received, he felt considerable doubt respecting the "category of citizenship"—native or alien—in which to class the badger killed under a tree at Bramham in 1880. It appears that a pair were imported into the district, not long ago, from Wentworth; of these the female was killed, and the male escaped into the woods. The weight of this was known, and it was a male of not incompatible bulk which was some time later shot by Mr. Fox's head keeper, in a situation most unlikely for a wild badger to take shelter in. A nest of the sedge warbler (with eggs) was observed by Bardsey pool. This concluded the meeting. At the Marsden gathering on August 2nd, the form (whether engrossed on vellum or otherwise) the Darwinian memorial shall take, will come up for decision.



“WITH THE YORKSHIRE NATURALISTS.”

[Reprinted from the “*Huddersfield Weekly News*,”
August 7th, 1880.]

The fifth meeting and excursion for 1880 in connection with the Yorkshire Naturalists' Union took place on Monday last. I was favoured with an invitation, and as it may not be generally known what naturalists do on their excursions, an account of what took place may not be uninteresting. I must confess that I joined the party in fear and trembling. There are only two conventional ideas of a naturalist. One is that of a wizened old Dryasdust, with goggle eyes and a skin the colour of lemon and the texture of parchment, who prowls about stagnant pools catching water-newts, and for whom little sympathy is felt (by unnaturalists) as

He got hold of her tail, and to land almost brought her,
When he plump'd head and heels into fifteen feet water.

The other accepted notion of a naturalist is precisely similar to the last one but of the feminine gender. So far as Yorkshire naturalists, at any rate, are concerned, however, there could not be a greater misconception. Genial and jolly, full of spirits, rich in the glow of health, and merry as the sunshine, it is evident that the studies they pursue are a pleasure to them, and that these scientific excursions are their delight. They speak scientifically, of course, and an uninitiated person is somewhat taken aback when he hears the veins in a leaf described as “isolated fibrovascular bundles” or a stinging nettle called an “*Urtica dioica*.” But one soon gets used to this kind of thing, and, as poets often tell us, we may enjoy all the beauties of Nature without knowing the name of a rock or a flower.

By what name
Botanic, ye are known,
I care not; you're the same—
In glory garmented—each in your own;
And God's benignant mercy to his creatures
Speaks out in all your fascinating features.

But it must be remembered that scientific names appeal not only to Englishmen but to all the world, and are not

merely names but descriptions. It would be as well, too, if the general public copied men of science in this respect, and were a little more exact in the way they speak of things. We should not then find such blunders made as calling a whale a "fish;" or as by the asthmatical old lady who complained that whereshe lived there were "equinoctial gales all the year round."

The Huddersfield contingent of the Yorkshire Naturalist Union assembled at the Huddersfield Station to meet the train due from Leeds at 10-10 a.m., when they joined their brother naturalists from Leeds, Harrogate, and other parts of Yorkshire and went on with them to Greenfield. Other batches of the human species, and belonging to the same Yorkshire Union, were already on their way to other parts of Yorkshire. Some were traversing Crosland Moor, Honley woods, Meltham, and Deerhill, conducted by Mr. S. L. Mosley, of Primrose Hill. Others went to Holmthrst, thence by Ford Inn, visiting the site of the buried forest discovered four years ago, over Harden Moss to Wessenden Head. Mr. J. W. Davis, F.G.S., of Chevinedge, near Halifax, made a tour all by himself by train from Eiland to Huddersfield, where he observed several specimens of perambulating humanity on the platform, which he duly examined, and then proceeded (by train) to Marsden, to await the arrival, in due course, at Blake Lee, of all the other little armies of naturalists that were scaling the hills and invading the valleys in every direction. I accompanied the Greenfield detachment, which numbered twenty-two.

At Greenfield station we were met by Mr. J. Hirst, of Saddleworth, who had kindly consented to act as guide. A more fortunate selection could not have been made. Mr. Hirst has made a special study of the whole neighbourhood. He had something to say, not only about every prominent feature in the district, but about every jutting rock, every dell, every road, and almost every field. No sooner had the ascent began from Greenfield station by a bye-lane leading to Bill's o' Jacks, than he drew attention to the boulders which are seen on the sides of the road, and embedded in the road itself. These, he said, were foreign metamorphic boulders, and he particularly wished the limit, *i.e.*, where they ceased to be found, to be noticed, and this was done, and doubtless the geological section of the Union will take the hint and inquire into the particulars of the glacial action which has caused the travelling boulders to so suddenly stop in their career. Near this boulder limit Mr. Hirst drew attention to Wharnton Tor, the peculiarity being that it is the most northerly peak in this district known as a Tor, the word usually applying to the conical hills in the southern counties. The names of the places, too, showed what had been the nature of the country in days gone by, as, far on the horizon's verge was "Hart's" head, and

the spot on which we were standing was "Hawk's" yard Mr. Hirst also pointed out the nature of the rock in the neighbourhood, which he said he now believed to be Yoredale shale.

In conversation of this kind we strolled towards Bill's o' Jack's, each member of the party looking after his own speciality. Now it was a particular kind of moss that attracted the attention of Mr. C. P. Hobkirk, or a fern with a big long name that delighted Mr. Thomas Hick; or Mr. G. T. Porritt had fallen in love with a rare caterpillar; or Mr. Prince would tell the name of a bird, where it had come from, where it was going, and what its business was, while Mr. Conacher searched diligently for shells; so that hardly a stone or a bird, or a flower, or an insect was seen without its history, and its uses being talked about and discussed.

Arrived at Bill's o' Jacks, the party rested for a short time to enjoy the scenery, which was all the more beautiful because lit up with the glory of sunshine. An old poet has sung:—

"The sun when he hath spread his rays,
And shown his face ten thousand ways,
Ten thousand things do then begin
To show the life that they are in.
The heaven shows lively art and hue
Of sundry shapes and colours new,
And laughs upon the earth."

And so on. So it was on Monday. The sun was in his glory, and from amid the witchery of a soft blue sky peered through the soft fleecy whiteness of silent clouds, upon a magnificent panorama. The majestic sweep of the hills, in verdure clad, and, it is no hyperbole to say, in strength arrayed, stretched as far as the eye could reach, or until but dimly visible in the blue haziness of the distance, through which glittered like crystal the silver streaks of the mountain rills. Even such a common-place thing as a reservoir in course of construction by real navvies in real corduroys, looked picturesque in the verdant bosom of the Greenfield valley; surrounded on all sides by hills decked with the heath with its full-round bells of brilliant pink, the less pretentious heather, and the orange-blush leaves of the bush of the bilberry. It was a day on which all nature was filled with gladness, and the earth and the heavens, the fields and the hills, were joying with an exceeding great joy.

Leaving the well-known rustic inn already mentioned, we began a short but steep ascent in order to reach the moors. It was tough work for the shoulders and knees, and many a one stopped—of course, not for rest—but to look at the beautiful landscape and to exclaim, or rather to sigh as well as their gasps would allow them, "What—a—splendid—view!" Here we encountered a specimen of

the *adolescensula decepta*, whose special function may be described as *varâ spe allicere*. "Yo look wairm," said the specimen. "No wonder!" said a naturalist. "Well," added the specimen, "I ha gotten summut in a bottle 'ere, wad yo loike to sup." "Yes, yes," eagerly answered a dozen naturalists. "Well then," replied the adolescentula, "noan on yo shall hev a drop"—and she went on her way rejoicing. So on we tramped across the moor, looking out for the game-keepers who were looking out for us; knowing it was near the "twelfth of August," and knowing, too, that some of our party had been turned back in attempting a moor on which it was known were some specimens of the rare *Malaxis paludosa*. Soon we came in sight, far off, sleeping silently, nestling amid hills where the heavens kiss the earth, of the town of Oldham, with its tall mill chimneys, its grey church tower, and its hazy canopy of soft smoke. We gave it a passing glance, as not belonging to us, because Lancashire, to Yorkshire naturalists is (on these occasions) forbidden ground. So we passed on, leaving Saddleworth Church to the left, and making towards Diggle. Mr. Hirst shewed us *en route* the effects of denudation in modern times—the best instance in this neighbourhood. The cattle tracks which have had to be made higher and higher as the denudation has proceeded were distinctly visible, as were also some other interesting features about the stream which is still carrying on its denuding work. Near this spot, too, Mr. Hirst pointed out to us, far away across the valley, an ancient "verge of the salt sea flood." High up the mountain there, fifteen hundred feet above the present sea level, was once the ocean, with its tides, its beach, its shells (which are still there), and almost everything just as it is at Blackpool at present, except that then there were no bathing machines, or donkeys, or lodging-house keepers, or nigger minstrels.

We then struggled across fields, climbed over walls, and at last reached Diggle Mill (where is the largest water-wheel in England). In the stream hard by Mr. Hobkirk came across a rather rare moss, the *Hypnum cordifolium*; and others amused themselves with the echo at the outlet of the reservoir. We proceeded along South Clough, where are cart-loads of fossils in the shale, chiefly of worm tracks. About here, too, Mr. J. Dore found several beautiful specimens of the white heath, a by no means common plant in the neighbourhood. South Clough had to be ascended by leaps from rock to rock, and from stone to stone. It is a magnificent cleft in Diggle Moss, down which the white waters merrily leap. Here we rested a while and drank of the cool stream, and enjoyed "our 'bacca" to the music of the summer torrent's gentle dash. It was a rest well earned, and what with the splendour of

the sky above us, and the glory of the scene around us, it is perhaps not surprising that a naturalist grew sentimental, and showed me a scrawl at the back of an envelope which began

I stood on the top of a moss-clad hill,
Where I stood twenty long years ago ;
I hear the soft dash of the mountain rill
As it steals to the valley below.
I see the streams as they ling'ring run
To the lake with its fringe of red rushes,
Now baring its bosom to the warmth of the sun
Now in the forest hiding its blushes.
I feel the glow of the heavens above
And the perfume of the breezes that blow,
I feel all the life, the glory, the love,
I felt twenty long years ago.

* * * * *

No, not all. I miss the maid with the soft blue eye
And cheeks tinged with the loveliest hue.
I miss the lips so tremblingly shy
I kissed—

I interrupted by asking my friend if he had ever seen a "moss-clad hill," on which he folded up his scrawl, and said I should read it when it had got the finishing touches to it.

Leaving this delightful spot, which, as was said of it, as well as of a fine rugged peak near Greenfield, would be an attraction to visitors for miles round if situated in a place with celebrity as a fashionable resort, like Windermere, we began the climb to the top of Broadhead Moss. The mountain side is rugged and steep—almost perpendicular in some places, and the task tried the lungs of us all. It is a hill, too, that delights in practical jokes, for we often thought that we had gained the brow, when really we had only reached a ledge that led us to a steeper climb. However, there is an end to everything—even a Lancashire and Yorkshire train arrives at last—and we did, at length, reach the top. We then went across the moor, stepping briskly on the black peat, soft and springy as a Turkey carpet, and seemingly anything but likely to become a bed of coal, which, Mr. J. W. Davis assured us in the evening is its destiny. A few drops of rain fell here, but the cloud soon passed away, though in the distance we could see that it was raining in torrents. We passed over Black Moss, and after a walk, or rather a series of jumps, of about a mile, over boggy and lumpy ground, we found ourselves at Redbrook Reservoir and Standedge, whence we went to Blake Lee, where the other sections of the Naturalists' Union concentrated, and we all made a hearty attack upon a substantial tea.

After tea references were made to the programme of the proceedings, where was found a glowing description of the

lovely spot known as Blake Lee, and which concluded with these words, "There is a petrifying well just behind the house." "Just behind the house" turned out to be across half-a-dozen fields, necessitating climbing over three stone walls, and three gates specially spiked to tear one's clothes. Then one had to stride over a waterfall and seizing hold of the end of a wall give a judicious swing to the other side, and drop a few feet to the bank of a merry gambolling brook. This had to be crossed by wading, and then was reached a grassy bank amid the verdure of which was trickling the petrifying water. This was the well: nothing to look at, at first, but which repays examination. The water, strongly impregnated with carbonate of iron, percolates the grassy bank, and the result is that the whole of it, though looking soft as any other grassy bank, is already half turned into ironstone, and is hard as rock. Many of the naturalists brought specimens away, as a memento of the one solitary grass bank which, when the denudation about it has done its work, will in years to come be a huge ironstone rock. We went back to Blake Lee by keeping to the banks of the brook, enjoying the walk much better than the gate climbing and the jumping by the way we took when looking for "just behind the house."

In the evening the various sections of the Union held meetings, and compared notes as to what had been observed on the excursions. Societies from the following places were represented:—Huddersfield, Dewsbury, Heckmondwike, Ovenden, Elland, Honley, Bradford, Leeds, Greetland, Liversedge; in all fourteen societies were represented. Afterwards there was a general meeting, presided over by Professor W. C. Williamson, F.R.S., the president of the Union. Some formal resolutions were duly submitted to the "contest of the eyes and nose," and the "ayes" had it all their own way.

Mr. THOS. HICK, B.A., B.Sc., of Harrogate, was then called upon to give the report of the sub-committee upon the address to be presented to Dr. Darwin on the fiftieth anniversary of the issue of his great work. Mr. Hick said: Gentlemen, In accordance with the instructions given at the Boston Spa meeting, we have considered the best form the address should take, and the other matters connected with it. We are prepared to recommend the Union to have it printed, or engrossed on a parchment sheet, put into a neat Morocco case, and then handed over to Dr. Darwin, either by a small deputation, or in some other way most convenient to Dr. Darwin himself. We do not think it wise to call upon the Union to pay the cost of this, and we have got together a few subscriptions which will enable us to get the address up in a neat and simple manner worthy of the occasion. The committee have also to suggest that you appoint another committee,

or the same one, to get the address printed, signed by the officers of the Union, the president, the vice-president, the secretaries of sections, the general secretaries, and the committee.

Mr. J. W. DAVIS, F.L.S., F.G.S. (Elland) said he still wanted a few more subscriptions to defray the cost.—Professor WILLIAMSON remarked that coming as it would from a number of working naturalists it would be better to have the memorial very neatly drawn up on parchment, and put into a proper and appropriate binding without any very extraordinary flourishes or displays, or more than was absolutely necessary. Mr. G. T. PORRITT, F.L.S. (Huddersfield), moved, Mr. S. BAIRSTOW, F.L.S. (Huddersfield), seconded, and it was carried, that the same committee be reappointed to see to the work regarding the memorial being carried out. Mr. GEORGE BROOK, ter., F.L.S. (Huddersfield), read a list of new subscribers, and, on the motion of Mr. HICK, seconded by Mr. E. F. BROOK (Huddersfield), thanks were voted to them. Mr. DAVIS moved a hearty vote of thanks to Messrs. Hobkirk and Mosley, and to Mr. John Hirst, of Saddleworth, for their kindness in conducting the parties. Mr. BARRETT (London) seconded the resolution, and it was passed.

The reports of the different sections were then given by the different secretaries.—Mr. S. D. BAIRSTOW reported as to the entomological specimens, which were very few in number, but still fully as many as they expected.—Mr. HOBKIRK reported as to the botanical specimens, which numbered 170, including 124 flowering plants, 33 mosses, 6 fungi, algæ, &c.—Mr. DAVIS, in the absence of Mr. Spencer (Leeds), spoke of the geological features of the district.—Mr. HICK said Mr. Hirst pointed out a number of shales, which were supposed to be Yoredale rocks.—Professor WILLIAMSON said he thought the district should be rich in fossil plants, and that what was required was that new localities should be opened out and worked.—Mr. PRINCE, in the absence of Mr. J. Varley (whose absence on account of illness was very much regretted), said that twenty-five species of birds had been seen. A song-thrush and nest with young had been found, which was recorded as rare at this period of the year.—Mr. CONACHER (Huddersfield) reported on conchology, stating that the moors were not fertile in shells, and as a consequence only six or seven specimens had been found, and these were not of a nature requiring special mention.—Mr. W. D. ROEBUCK (Leeds) proposed that Mr. Thos. Lister, of Halifax, be the representative of the Union at the next meeting of the British Association.—Mr. DAVIS seconded the motion, which was carried unanimously.

The rest of the evening was spent in a pleasant chat and stroll with Professor Williamson, who is not only a good

naturalist but a good companion. Thus ended a well-spent day. There can be no doubt that such excursions are productive of an immense amount of good. Flowers are beautiful for their colours alone, it is true, and the landscape is pleasing to the eye, as is the song of the bird to the ear; but the enjoyment is multiplied a thousand fold when each boulder on the road, every patch of green moss at the water fall, every butterfly that flutters in the sunbeam, speaks a volume. The head as well as the heart is then gratified, and how easy, with patience and perseverance, it is thus to enjoy "the charms of nature," is evident from the fact that everything on the face of the earth, in the heavens above the earth, and in the waters under the earth, has a lesson to teach to those who are willing to learn. Look for instance at a little daisy! Simple and humble as it is, yet if we peer into its golden disc, we see in it one of Nature's most complicated and delicate works—a whole head of flowers, each in perfect miniature, crowded into a circle of half-an-inch diameter. The circlet of single blossom is in reality a thick-set head of lovely little bells, clustered thickly together, each with a yellow fringe, shaped like a Canterbury Bell. In the very heart of the flower, each tiny floret is still unopened—in the bud so to speak—and they stand like little golden knobs too small to be counted by the naked eye. Each one is a perfect miniature flower. Is not all this worth knowing? Is it not worth while to inquire into the why and the wherefore of the arrangement, to learn all about the joint effect of incident sunlight, freer elbow room, natural selection, and a host of other things that cannot be entered upon here? Surely it is, and it is in this way that flowers, and insects, and birds, and rocks should be studied, not simply gazed at; as well ask the blind to enjoy the glories of a sunset, or exhort the deaf to drink in the sublime strains of Beethoven, as expect an ignoramus thoroughly to enjoy a walk in the country.

Diary.—Meetings of Societies.

- August 2. Bank Holiday. Yorkshire Naturalists' Union.—Excursion to Marsden, near Huddersfield, the Moorlands of South West Yorkshire. Tea at Blake Lee, Marsden, at 4-30 p.m. Sections at 5-30 p.m.; General Meeting at 6-15 p.m. Leeds Naturalists' Club, &c. Vertebrate and Entomological Sections. Liversedge Naturalists' Society. Bishop Auckland Naturalists' Society. Barnsley Naturalists' Society. Wakefield Naturalists' Society.
- .. 7. Huddersfield Naturalists' Society.
- .. 10. Leeds Naturalists' Club, &c.—Botanical and Microscopical Sections.
- .. 11. York and District Field Club.
- .. 12. Dewsbury Naturalists' Society.
- .. 13. Huddersfield Scientific Club.
- .. 14. Local Naturalists' Association.—Excursion to Hunger Hills, Thornhill Edge. Meeting at Working Men's Club, Dewsbury, at 6 p.m.
- .. 19. Manchester Cryptogamic Society.
- .. 17. Leeds Naturalist Club, &c. Barnsley Naturalists' Society.
- .. 20. North Staffordshire Naturalists' Field Club.—Excursion to Alton and Oakamoor. Leader—Mr. C. L. Wragge.
- .. 23. Huddersfield Naturalists' Society.
- .. 24. Leeds Naturalist's Club, &c.—Vertebrate and Entomological Sections. Barnsley Naturalist's Society.—Excursion to Langsett Moors.
- .. 30. Lancashire and Cheshire Entomological Society.
- .. 31. Leeds Naturalist's Club, &c.—Botanical and Microscopical Sections. Barnsley Naturalists' Society.

WILL any Botanist meeting with *Potamogetons* or *Charas* during the ensuing season kindly send me fresh or dried specimens, especially if in fruit? I shall be very pleased to send rare Southern, South-eastern, or Eastern flowering plants in exchange, either living or dried.

(*P. crispus*, *densus*, and *polygonifolius* not wanted).—A. B., 107, High Street, Croyden, Surrey.

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of "The Birds of Yorkshire," by Mr. W. E. Clarke; of an "Annotated List of the Land and Fresh-water Mollusca of Yorkshire," by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on "Yorkshire Macro-lepidoptera in 1877," by Mr. G. T. Porritt, F.L.S.; one on "Yorkshire Micro-lepidoptera in 1877," by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on "Yorkshire Diptera," and on the Yorkshire species of Hemiptera of the Family *Psyllidæ*; and a report on Yorkshire Botany in 1877.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding"; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LXII.

SEPTEMBER, 1880.

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Subscribers are reminded that subscriptions to Vol. VI. were due in August, and those who have not already done so are requested to forward Stamps or P.O.O. for the amount (4/-) at once.

We regret to say that our circular has not produced anything near the number of additional subscriptions we asked for. We are, therefore, compelled to keep to our 16pp.—*Eds. Nat.*

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Original Articles.

THE RISE OF THE LITERATURE OF ENTOMOLOGY.

BY WILLOUGHBY GARDNER.

(Continued.)

IN the third class, the first book on the list is that of PEUCER, whose work on "Quadrupeds, Insects, &c.," was first published at Leipzig A.D. 1550, and went through many subsequent editions.⁶ Next we find one of our own countrymen, the learned Dr. WOTTON, publishing at Paris, in 1552, a work on "Natural History,"⁷ in ten books, dedicated to King Edward VI. Dr. Wotton subsequently purchased Gesner's posthumous papers on insects, of which I spoke above, from Joachim Kamerarius. Another writer, according to Percheron, treats about this time of water insects, viz., GUILLAUME RONDELET, who published a large folio in 1554 at Lyon, on "Fishes, &c."⁸ I cannot say, not having seen the book, whether it contains very much of note entomologically, but Rondelet had a great knowledge of fishes—so much so, that his work has formed the foundation of all subsequent ones on the same subject, and indeed it is said that very little of importance has been added, since his work, to the natural history of the fishes of the Mediterranean. In the last class we find several small works on various species of insects noticeable for their utility, their ravages, or otherwise. The first is a small volume by CHR. HAGENDROPHINUS⁽⁹⁾, published A.D. 1526; the next, in point of time, is by the Latin poet MARCUS HIERONIMUS VIDA, who was born at Cremona A.D. 1490; he wrote a long poem on "The Culture and Use of the Silkworm,"⁽¹⁰⁾ which was first published at Rome in 1537, and went through as many as nine subsequent editions, thus showing that there was no lack of interest in the silkworm at that time. Then the bees have their turn, for GIOVANNE RUCELLAI, an Italian, filled an 8vo volume with a poem describing their economy, which was first published, after his death, at Venice, A.D. 1539⁽¹¹⁾; this, like the last, was evidently a popular work, for it went through five other editions, and we find it said by a

N. S., VOL. VI.—SEPT., 1880.

(6) *Appellationes quadrupedum, insectorum, etc., etc.*, in 8vo. Lipsiæ 1550, Wittemberg, 1551, 1556, and 1558; Leipzig, 1559 and 1564.

(7) *De differentiis animalium libri decem*; in fol. Parisiis, 1552.

(8) *De piscibus marinis, universæ aquatiliæ historiæ pars altera* (with good wood engravings) in fol., Lugduni, 1554-55, and a French translation in fol., Lyon, 1558.

(9) *Declamatio in laudem ebrietatis et encomium Muscæ*, in 8vo. Hagenoæ, 1526.

(10) *De Bombycis cura et usu, libri 2*, in 4to, Romæ, 1537; in 8vo, Lugduni, 1537; in 8vo, Basil, 1537; in 12 mo, Antwerp, 1585; in 8vo, Cremona, 1560.

(11) *Apes*, in 8vo, Venezia, 1539.

contemporary writer that the "Bees," an imitation of the 4th Georgic of Virgil, was esteemed "a poem of exquisite sweetness." Two years after this (A.D. 1541) we find in volume i. of a book by ERASMUS EBERNERUS, a description headed "The Praise of Ants" ⁽¹²⁾ The next year, a German of the name of RUSCHEYT brought out a volume ⁽¹³⁾ describing the "Grasshoppers seen in Silesia in 1542"; two years later, we find a small volume on "Fleas," by MOSCHETTI ⁽¹⁴⁾, and in the year 1546 one ANT. THYLESIUS brought out a book on "Spiders and Glowworms." ⁽¹⁵⁾

Such was the state of Entomological Literature when Oxford University produced a learned student of nature, and more particularly of the branch in which we are specially interested—Dr. MUFFET or MUFFET. This Dr. Muffet (to quote Anthony Wood in his "Athenæ Oxoniensis," was "educated in this University"—i.e., Oxford—"and afterwards travelled into divers countries in Europe, where he became known to the most eminent physicians and chymists of that time, and was doctorated in physic in some noted university in his travels.....He became much honored and beloved by Peregrine Bertie, Lord Willoughbie of Eresbie, and esteemed the famous ornament of the body of physicians, and the true pattern of all polite and solid literature, &c." Such was the man who, far from despising entomology, not only deemed it worthy of his attention, but even made it the favourite study of his life. Dr. Muffet wrote several books, ⁽¹⁶⁾ but his greatest achievement was undoubtedly his "*Theatrum Insectorum*." This work he probably commenced during his travels on the continent, when at the different universities he would have access to the numerous books he consulted; and, as Wood says, he became intimate with the most scientific men of his time. I have enumerated above all the notices of insects now generally known to exist in printed books at that period; but Muffet in his book gives a list of 406 authors whose writings he had consulted in compiling his own work. Many of them I find to be

(12) *Encomium Formicarum, Amphitheatr., Dornanii, t. 1, and with "Melanckthon"* in 4to, Argent., 1541.

(13) *Wahrhaftige Zeitung in Schlesien geschehen, 1542, von unerhörten Heuschrecken wie viel der gewesen, und was sie gehadent gethan haben, in 4to, 1542.*

(14) *De Pulice, in 8vo, 1544.*

(15) *De Araneola et cicindela, 8vo, Lutet. 1546.*

(16) *De jure and praestantia Chymicorum medicamentorum dialogues Apologeticus* Francof. 1584; Ursell, 1602. *Epistolæ quinque medicinales* (printed with 1602 edition of last work). *Nosomantica Hippocratea; sive, &c., &c., Franc., 1598* (in nine books). *Health's Improvement: or Rules comprising and discovering the nature, method, and manner of preparing all sorts of Food used in the Nation; 4to, London, 1655.* *De Anodinis Medicamentis Theses in medica, Basilicæ propositæ; Basil, 1578.*

medical writers who rank certain insects among their *Materia Medica*, or on the other hand give receipts for the cure of the baneful effects caused by bites and stings; others, again, are names of well-known classical authors—Greek and Latin—who draw similies from insects and their economy. But of a great number I can find no mention, and I suppose we may conclude that they were possibly only M.SS. which have since perished with the names of their authors also.

I must now digress a little to follow the vicissitudes of Conrad Gesner's papers on Entomology. I mentioned them above as having been purchased at his death by Joachim Kamerarius, and afterwards falling into the hands of Dr. Wotton, who sent them to a publisher in London named Thomas Penn, also a great student of Nature, and an observer of insects in particular. For some reason or other Penn did not fulfil his commission, and at his death these poor knocked-about papers fell into the hands of Dr. Muffet, who purchased them along with some other M.SS. by Dr. Wotton and T. Penn, to incorporate with his "*Theatrum*." We thus see that Thomas Muffet's book contains the writings of GESNER, WOTTON, and PENN, which he weaves together into a tangible form, adding and correcting from the authors whose names he enumerates at the commencement of his work; in addition to these, his own observations and those of certain entomological friends he seems to have had, form no small part of the contents. Soon after completing his book Dr. Muffet seems to have died, leaving it in M.S., in which state it lay for many years almost forgotten.

Meanwhile, while Muffet had been writing his book, and after his death, numerous other works were published containing more or less brief accounts of insects. These may be divided in the same manner as before, to guide us in our search. In the first class—books on medicine—we find insects mentioned by BAUHIN, who in 1598 published a "*History of the wonderful Medicinal Spring in the Duchy of Wirtemberg, with many Figures of various Insects found in the Neighbourhood*." (17) This Bauhin obtained his greatest fame as a botanist; he and his brother are said to have labored for forty years for the advancement of that science. In the same class of books insects are casually treated of by LAURENT. CATELAN, a chemist

(17) *Historia admirabilis fontis Bollensis, in ducato Wirtenburgico, cum plurimis figuris variorum Insectorum quae in et circa hanc fontem reperiuntur*; in 4to, Montisbeligardi, 1598; in German, in 4to, Stuttgarten, 1602. He also mentions insects in *De aquis medicatis nova methodus*, in 4to, Mont., 1605-7-12; and a book with no other title than "*Vivitur Ingenio caetera mortis erunt*" treats of insects and plants.

of Montpellier, ⁽¹⁸⁾ by ANGELINUS, ⁽¹⁹⁾ and by BERTALDI. ⁽²⁰⁾ THEODOSIUS, also a learned doctor, in his "Letters on Medicine," devotes one to Glow-worms. ⁽²¹⁾ The second class, which contains histories of countries, includes CASTAQUEDA's large "History of Oriental India," ⁽²²⁾ which mentions certain insects, and SCHWENK-FEELD's "Theriotrophium," ⁽²³⁾ in which, according to the title, the "nature and use of certain animals, birds, insects, &c., are set forth." In the class in which we rank works on Natural History in general—No. 3—we find several works appearing about this time. The first in chronological order is the work of SCALIGER, ⁽²⁴⁾ in fifteen books, which contains cantharides, bees, silkworms, and locusts. Next comes the large folio Nat. Hist. of FERRANTE IMPERATO, ⁽²⁵⁾ and the same year we find that most important work on the same subject by ULYSSES ALDROVANDUS, published in folio at Bologna ⁽²⁶⁾. Vol. iv. of this tremendous achievement, which appeared A.D. 1604, contains seven books on insects, which recapitulate all that had previously been written on the subject; the letter-press is supplemented by very numerous illustrations, making it altogether a most important work—not, however, a separate publication like Muffet's, but merely a single volume of a more comprehensive work. In the year 1605 CLUSIUS (who, as we gather from hints in Muffet's work, was no mean entomologist, and himself a personal friend of Muffet's) published a "History of Exotic Animals and Plants." ⁽²⁷⁾ This author, whose descriptions are remarkable for exactness and elegance, is most generally known to the scientific world as the delineator, in the work mentioned above of that curious and now extinct bird, the dodo. In

(18) *Démonstration des ingrédients qui entrent dans la confection de l'Alchermes*; in 12mo, Montpel., 1609 and 1614.

(19) *De verme admirando per nares egresso*; Ravenae, 1610.

(20) *Confectio de Hyacintho et confectio alchermes*, in 4to, Taurinii, 1613-19.

(21) "De Lampyridæ" in his *Epistol. Medic.*, ep. 50, p. 305; in 8vo, Bale, 1553. He also mentions insects in an epistle, "Quid sit Verticellus, Polypus, Cochlea, Spondylus," *Epistol. Medic.*, ep. 17, p. 48.

(22) *Historia dell' Indie orientale* (translated from the Spanish by A. Villosa), 7 vols. 4to, Venezia, 1578.

(23) *Theriotropheum Silesiæ, in quo animalium, quadrupedum, reptilium, avium, piscium, insectorum natura, vis et usus sex libris perstringuntur*; 4to, Lignicii, 1603 and 1604.

(24) *Exoticarum exercitationem liber XV. de subtilitate H. Cardan*; in 4to, Paris, 1557; 8vo, Bale, 1560, &c. (often reprinted); "De Cantharidibus"—de sub. ex. 184, p. 605; "De Apibus, Bombycibus et melle vesparum"—de sub. ex. 191, p. 623; "De Locustis"—de sub. ex. 192, p. 625.

(25) *Dell' Historia Naturale libri 28*; in fol., Napoli, 1599, and other editions.

(26) *Historia Naturalis*, 13 vols. in fol. Bunoniæ, 1599, and following years (best edition); in fol. Bunon., 1602; in fol. Franckfort, 1623; in fol. Bunon., 1638.

(27) *Exoticarium libri decem quibus animalium, plantarum, etc., historiæ describuntur*; in fol. Antverpiæ, 1605.

1616 we find a large folio by COLUMNA, called "Observations on certain aquatic and terrestrial animals," (28) in which one chapter treats of the glowworm, and two others on two kinds of beetles, while part ii. is devoted to caterpillars. (29) The last work of this class we have to notice is ARCHIBALD SIMOON'S quarto, published at Edinburgh A.D. 1622, purporting to be a "History of all the Animal Creation, including insects, found in the Holy Scriptures." (30)

(To be continued.) 33

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

LABIATÆ.

- Salvia verbenaca*, L. (A) Penmon, &c.; (C) Great Ormshead, &c.
Lycopus europæus, L. (A) Llanfair. P. G. Cors ddygai; (C) Cwyrion Lake, near Bangor, &c.
Mentha rotundifolia, L. (A) Llanddwyn.
M. hirsuta, L. Common in both counties.
M. sativa. Frequent in do.
M. arvensis. Do. do.
M. Pulegium, L. (A) Llanfair, P. G., common, north-east end.
Thymus Serpyllum, L. Abundant in both counties.
Origanum vulgare, L. (A) Between Gallows Point and Beaumaris, &c.; (C) Great Ormshead, &c.
Calamintha Acinos, Clairv. (C) Great Ormshead, Bangor, &c.
O. officinalis, Moench. (C) Abundant on Great Ormshead, &c.
O. Clinopodium, Benth. Frequent in both counties.
Nepeta Glechoma, Benth. Abundant in both counties.
N. Cataria, L. (C) On the beach between Llanfairfechan and Penmaenmawr.
Prunella vulgaris, L. Abundant in both counties.
Scutellaria galericulata, L. (A) On the margin of Llyn llwydeart, &c.; (C) Felyn esgob, Bangor.
S. minor, L. In a dingle near Ty Fry, Pentraeth, &c.; (C) below Dolbadern Castle, Llanberis.

(28) *Aquatilium et terrestrium, aliquot animalium aliorumque naturalium rerum observationes* (with figures), in 4to, Romæ, 1616.

(29) *Eruca rutacea ejusque Chrysalidis et Papilionis observationes*.

(30) *Hieroglyphica animalium.....insectorum qui scripturis sacris inveniuntur*, in 4to.

- Marrubium vulgare*, L. (C) Great Ormshead, &c.
Stachys Betonica, Benth. Frequent in both counties.
S. sylvatica, L. Abundant in both counties.
S. palustris. Do. do.
S. arvensis. Do. do.
Gaieopsis ochroleuca, Lam. Said to be growing near Bangor, but I never found it myself.
G. Tetrahit, L. Common in both counties.
Ballota nigra, L. Frequent in both counties.
Leonurus Cardiaea, L. (C) On the banks of Aber river, near the mill.
Lamium amplexicaule, L. Not uncommon in both counties.
L. purpureum, L. Abundant in both counties.
L. album, L. (A) Near Llanddyfnan; (C) near the entrance to Gloddaeth woods, Llandudno.
L. Galeobdolon, Crantz. (C) Between Llanrwst and Trefriw.
Teucrium Scorodonia, L. Abundant in both counties.
Ajuga reptans, L. Do. do.
A. alpina. (C) Carnedd, Llewelyn.

VERBENACEÆ.

- Verbena officinalis*, L. (A) Gallow's Point, &c.; (C) Gogarth, Great Ormshead, between Llanfairfechan and Aber, near the beach, &c.

PLUMBAGINACEÆ.

- Statice Limonium*, L. (A) On the rocks near the beach between Penrhyn, Aberffraw, and Llangwyfan church.
S. reticulata. (A) Porth dafarch and Porth Pistell, near Holyhead.
Armeria vulgaris, Willd. Abundant round the coast of both counties.

PLANTAGINACEÆ.

- Plantago major*. Abundant in both counties.
P. lanceolata, L. Do. do.
P. maritima, L. Frequent along the coast of both counties.
P. Coronopus, L. Common in both counties.
Littorella lacustris, L. (C) Ogwen lake, Bochllywd lake, and near the outlet of Idwal lake, &c.

CHENOPODIACEÆ.

- Salicornia herbacea*, L. (A) On the shore at Malltraeth, &c.; (C) between Llanfairfechan and Aber.
Suaeda maritima, Dumort. (A) Near Llandysillio church.
Salsola kali, L. (A) Towyn Capel, near Holyhead; (C) between Llanfairfechan and Aber, &c.

Chenopodium album, L. Abundant in both counties.

C. rubrum, L. Frequent in both counties.

C. Bonus-Henricus. Do. do.

Beta maritima, L. (A) Along the south-west coast, abundant; (C) near Gogarth, Great Ormshead, &c.

Atriplex portulacoides, L. (A) Near Llandysillio, Menai Bridge, &c. (C) between Aber and Llanfairfechan.

Atriplex patula, L. Common on the coast of both counties.

A. angustifolia, L. Frequent in both counties.

POLYGONACEÆ.

Rumex aquaticus, L. (A) Abundant on Cors ddygai, &c.

R. crispus, L. Frequent in both counties.

R. obtusifolius, L. Abundant in both counties.

R. sanguineus, L. (A) Near Holyhead; (C) above Bethesda, &c.

R. acetosa, L. Abundant in both counties.

R. acetosella, L. Do. do.

Oxyria reniformis, Hook. (C) Twll du, &c.

Polygonum aviculare, L. Abundant in both counties.

P. maritimum, L. Frequent in both counties.

P. Raii, L. (A) Between Tal y Foel and Llanddwyn; (C) Llandudno, &c.

P. convolvulus, L. Frequent in both counties.

P. viviparum, L. (C) Rocks above Llanberis.

P. Bistorta, L. (A) Near Llanfaes church, &c.; (C) Nant Offeron, Bangor.

P. amphibium, L. Common in both counties.

P. Persicaria, L. Do. do.

P. lapathifolium, L. Do. do.

P. Hydropiper. Frequent in both counties.

P. minus, Huds. Do. do.

THYMELACEÆ.

Daphne Mezereum, L. Frequent in cottage gardens in both counties.

D. Laureola, L. (A) Cadnant Dingle, &c.; (C) wood near Port Penrhyn lake, &c.

EUPHORBIACEÆ.

Euphorbia Helioscopia, L. Abundant in both counties.

E. Peplus, L. Do. do.

E. segetalis, L. (A) Abundant on rocks near South Stack, Holyhead, and along the south-west coast.

E. Paralias, L. (A) Abundant at Llanddwyn, &c.

Mercurialis perennis, L. Abundant in both counties.

M. annua, L. (C) Port Penrhyn, Bangor (sparingly).

EMPETRACEÆ.

Empetrum nigrum, L. Common on the Snowdonian range.

CALLITRICHACEÆ.

Callitriche autumnalis, L. (A) Coron Lake, &c.

C. verna, L. Frequent in both counties.

URTICACEÆ.

Urtica urens, L. Abundant in both counties.

U. dioica, L. Do. do.

Parietaria officinalis, L. do.

Humulus Lupulus, L. Frequent in both counties.

Ulmus montana, Sm. Frequent in woods in both counties.

U. campestris, Sm. Do. do.

AMENTACEÆ.

Myrica Gale, L. Common in bogs and on wet moors in both counties.

Alnus glutinosa, L. Abundant in both counties.

Betula alba, L. Do. do.

Carpinus Betulus, L. Common in both counties.

Corylus Avellana, L. Do. do.

Fagus sylvatica, L. Do. do.

Quercus Robur, L. Do. do.

Salix pentandra, L. Frequent in both counties.

S. fragilis, L. Do. do.

S. alba, L. Do. do.

S. triandra, L. Do. do.

S. viminalis, L. Common in both counties.

S. capræa, L. Do. do.

S. aurita, L. Do. do.

S. repens, L. Do. do.

S. repens, var. *argentea*. (A) South-west coast, near Towyn Capel.

S. herbacea, L. (C) Tŵll du, Ysgolion duon, &c.

S. aquatica, L. Common in both counties.

S. oleifolia, L. (A) Near Beaumaris.

Populus alba, L. Common in woods in both counties.

P. tremula, L. Do. do.

P. nigra, L. Do. do.

CONIFERÆ.

Pinus sylvestris, L. Abundant in both counties.

Juniperus communis, L. Frequent in both counties.

J. nana, L. (C) Great Ormshead, &c.

Taxus baccata, L. (A) Frequent; (C) cliffs, Great Ormshead, &c.

TYPHACEÆ.

Typha latifolia, L. Common in both counties.

T. angustifolia, L. Frequent in do.

Sparganium ramosum, Huds. Common in both counties.

S. simplex, Huds. Do. do.

S. natans. (A) Cors ddygai; (C) Llyn cwm.

ARACEÆ.

Arum maculatum, L. Abundant in both counties.

LEMNACEÆ.

Lemna minor, L. Abundant in both counties.

NAIADACEÆ.

Zostera marina, L. Not uncommon around the coast.

Ruppia maritima. (A) Aberffraw river.

Potamogeton natans, L. Abundant in both counties.

P. heterophyllus, Schreb. (A) Llyn Llwydrart, &c.

P. lucens, L. Not uncommon in both counties.

P. lanceolatus, Sm. (A) In a small river under Penrhos Llegwy church.

P. perfoliatus, L. (A) Cors ddygai, &c.

P. crispus, L. Frequent in both counties.

P. densus, L. (A) Cors ddygai, &c.; (C) Cwm glo, &c.

P. pusillus. (A) Aberffraw river, &c.

P. pectinatus. Frequent in many parts of Anglesea.

(To be continued.)

Short Notes and Queries.

BOTTLE-NOSED DOLPHIN ON THE YORKSHIRE COAST.—My attention has recently been called to two Cetacea which were offered for sale in Sheffield, and described by the owner as "Grampus whales," caught at Spurn Point in September last. On inspecting them I found they were not Grampus whales, but probably the bottle-nosed dolphin *Delphinus tursio*, Fab.) and as the occurrence of this species is very unfrequent, perhaps its appearance on the Yorkshire coast may be worth noting. In order to satisfy myself as to the exact place of capture, I communicated with the secretary of the Literary and Philosophical Society of Hull, who referred me to Dr. Foster, of that town. Dr. Foster informs me that there were two specimens of the Hyperoodon—one 28ft. long, a female caught at the junction of the river Hull with the Humber, and the other in Patrington Haven, which communicates also with the Humber. These animals were killed whilst stranded. The one caught in Patrington Haven was denuded of flesh and the bones brought to Hull, Dr. Foster

consenting to superintend their articulation ; and the skeleton afterwards passed into the hands of some private individual. If this cetacean was accurately identified as *Hyperoodon*, only one species of which—known as the bottle-head (*H. Butzkopf*, Lacep.)—occurs on our coasts, its appearance is very remarkable on account of its extreme rarity. Dr. Foster also informs me that five specimens of *Grampus* were killed a few days after these between Kilnsea and Spurn, and I have little doubt that the specimens offered to me are a part of this capture. The following description will, I think, show that they are bottle-nosed dolphins :—They are both adult specimens, and are 10ft. and 11ft. long respectively. The head is produced into a snout, with a distinct forehead $4\frac{1}{2}$ in. from snout, the lower jaw projecting a little beyond upper; blowhole crescentic, 16in. from end of snout, and with a flattened and somewhat hollow space for six inches behind it. Teeth $\frac{22}{0}$ $\frac{22}{0}$, conical and slightly incurved ; eye at side, in line with gape and immediately beneath blowhole. Dorsal fin 11in. high, 22in. long, and its origin 4ft. 4in. from end of snout. Pectoral fin 25in. from snout, 19in. round the outer edge ; length of gape 14 inches ; tail 23in. wide, pointed at each end, but without any decided notch. On the other hand, an adult *Grampus* measures about 21ft. in length, has only about eleven teeth on each side of each jaw ; the head is blunt, and not produced into a snout, and has no distinct forehead. Another cetacean, a young specimen of the northern rorqual (*Balænoptera boops*, Flem.) 16ft. long, caught at Bridlington April 5th, 1880, has recently been exhibited in Sheffield.—E. HOWARTH, Weston Park Museum, Sheffield.

Lobophora viretata.—I took a very fine specimen of the above at Grange on Whit-Tuesday ; I also took, amongst others, *A. derivata*, *E. octomaculalis*, and larvæ of *X. citrargo*.—JOHN FIRTH, Bradford.

MALFORMATION OF THE ROOK'S BEAK.—While examining a private collection of birds belonging to Mr. Matthewman, of Selby, I was shown a singular freak in the beak of the rook. The lower mandible was of the usual size and shape, but the upper mandible was as long again as the lower one, and curved downwards after the manner of the curlew's beak, which gave the bird a very singular appearance. It was shot near Selby.—WALTER RAINE, Leeds.—[We know of other malformations in the beak of the rook ; in one case the mandibles cross each other in the same way that those of the crossbill do, but to a greater extent.—Eds. *Nat.*]

POLECAT NEAR LEEDS.—Last February, my friend Mr. Harrison and myself had the good fortune to see a polecat at the Seven Arches, near Adel. We disturbed it from under the root of a tree, near the stream that runs under the arches. We should not have noticed it, had it not attracted our attention by its cries. The polecat is a very scarce animal in the neighbourhood, for, being great enemies to the gamekeepers, they

do all they can to destroy them. They are often found, like the stoat, to be minus a leg, for if caught in a trap by the leg, they frequently release themselves by biting off the leg close to the trap, thus enabling them to escape. A stoat that was caught in this way a short time ago only possessed one leg, having had to sacrifice the other three to save its life. It is a pity that this martyr of a stoat's life was not spared, as it could not have done much harm in the way of destroying game, and would have to be contented with mice, rats, worms, &c., for its diet. I have lately obtained a fine pair of weasels which were caught by a cat at Ryther. Both stoats and weasels are rather plentiful in the rocky neighbourhood of Adel, but the place where they are to be seen in greatest numbers is at Bishop's Wood, near Selby, where on my last visit I counted above 200 specimens hung up at the storekeeper's museum.—WALTER RAINE, Leeds, August 13th.

CAPTURES IN THE NEW FOREST.—I had a few days at Brockenhurst last week. Larvæ were very plentiful, and included *Lithosia quadra*, *Demas coryli*, *Cleora glabraria*, *Nola strigula*, *Notodonta trepida*, *chaonia* and *dodonæa*, *Cymatophora ridens* and *flavicornis*, *Liparis monacha*, *Trachæa piniperda*, *Ennomos erosaria* and *tiliaria*, and many other commoner species. Of imagos I took *Limenitis Sibylla*, *Argynnis Valezina* (5), *Adippe* and *Selene*, *Pieris crataegi* (one worn-out specimen), *Lycæna Ægon*, *Macaria alternata* (a worn female specimen), *Eupithecia succenturiata*, *Emmelesia alchemillata*, *Cidaria picata*, *Melanippe rivata* and *unangulata*, *Zygæna meliloti*, *Eulepia cribrum*, *Lithosia mesomella*, &c. I also saw three empty chrysalis cases of *Apatura Iris* found by other collectors, two on one twig of narrow-leaved willow, the third by a lady close to where I was standing, in New Park enclosure.—J. P. BARRETT, London, July 21st.

WELSH BUTTERFLIES.—As Mr. Bairstow asks the experience of others in the *Naturalist* for June, I send you a few particulars of the butterflies which I have taken in Wales. *Argynnis Paphia* and *Aglaia*, common near Tenby, South Wales, Aug., 1871; *A. Euphrosyne*, near Llandindrod Wells; *V. Atalanta*, common; *Satyrus Ægeria*, common; *S. Megæra*, common; *S. Semele*, very common on rough grounds near Tenby, South Wales, 1871; *S. Janira*, common; *S. Tithonus*, very common round Tenby—I took a bleached variety in August, 1871, on Penally Marsh. near Tenby, vide *Entom.*, Vol. xi., p. 228; *S. Hyperanthus*, saw several specimens near Tenby, Aug., 1871; *Chortobius Pamphylus*, common; *Polyommatus phlæas*, common near Tenby; *L. Alexis*, also common near Tenby on above date (saw a hermaphrodite specimen, alive, taken there); *L. argiolus*, common round Tenby and at Carew Castle.—(I have seen this species flying round the ivy on the trees growing on the cliff); *Anthocharis cardamines*, very common at Llandrindod Wells; *Hesperia Tages*, several specimens at Llandrindod Wells—GEO. W. OLDFIELD, The Cedars, Harrogate, June 30th.

ABUNDANCE OF *Acronycta alni*.—A friend who is collecting in the New Forest has secured about three dozen larvæ of this species during the past month by beating, whilst another collector has got about 40. Altogether over 100 have been taken by different lepidopterists! *Stauropus fagi* was common there in June, as indeed it seems to have been in all its localities this year.—GEO. T. PORRITT, Huddersfield, Aug. 19th.

Aplecta occulta AT YORK.—I have taken thirty-five specimens of *Aplecta occulta* at sugar in Sandburn Wood. I took eight last night and eleven on Tuesday night, and all were captured with the wind north-east. Only three specimens have previously been taken at York during the last twenty-five years.—WILLIAM PREST, 13, Holgate Road, York, Aug. 20th.

Aplecta occulta AT HUDDERSFIELD.—This week I took a specimen of *Aplecta occulta* at sugar in Mr. Beaumont's wood here.—G. C. B. MADDEFN, Armitage Bridge Vicarage, Huddersfield, Aug. 20th.—[It is a great many years since *Aplecta occulta* was taken in this district.—EDS. NAT.]

Polypogon monspeliensis NEAR LEEDS.—Mr. Jas. Abbott showed to the Leeds Naturalists' Club, on the 17th of August, specimens of this grass, which is only found native in damp positions on the south-east coast. He had found them on rubbish heaps by a roadside near Leeds, where it had no doubt sprung up from seeds casually introduced. Dr. Lees has no previous record for Leeds, but Mr. Hobkirk has recorded it in his "Natural History of Huddersfield" as occurring near that town under similar suspicious circumstances more than once. It is an alien, casually introduced, and as it is an annual there is no certainty of its springing up again in the same spot. Mr. Abbott refrained from mentioning the exact spot, in order to give the remaining plants a chance of perfecting and depositing their seed.

Rainfall for July.

	Height of gauge above sea level.	Rain-fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 5·58	22	19·22	* 17·22	13	1·17
HALIFAX... (F. G. S. Rawson)	360	5·26	23	23·86	24·39	...	...
BARNSELY ... (T. Lister) ...	350	7·06	20	19·88	18·45	17	1·92
INGBIRCHWORTH (do.)	853	6·33	23	24·97	22·68	17	0·95
WENTWORTH CASTLE (do.)...	520	5·42	19	19·18	18·87	17	1·23
GOOLE ... (J. HARRISON) ...	25	4·76	20	16·58	15·39	26	6·3

* This is the average to date for 14 years, 1866-79.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Aug. 17th, the president, Mr. T. Lister, in the chair.—The following amongst other species of moths were exhibited :—*Urapteryx sambucata*, *Pericallia syringaria*, *Emmelesia alchemillata*, *ducania*, *lithargyria*, *Abrostola triplasia*, and *Plusia chrysitis*. In an excursion to Langsett five magpies were seen at Brockholes, the same place where the curious facts about the snipe and cuckoo were reported by Mr. W. Dransfield. A half-fledged snipe taken from a retriever, was fed by the keeper's wife on bits of rabbit and raw flesh, which it would take from the hand, and dip its long bill into a deep plate filled with soil, and might have grown to maturity to throw light on the questions of natural and acquired habits, so much talked about in these days, but it met the usual fate of favourites—perishing from accidental neglect in the absence of the family. A titlark's nest, with its sole occupant a young cuckoo, was pointed out by his setter. It was replaced, to the satisfaction of its foster parents. Mr. Creighton reported a cuckoo fed by pied wag-tails at Hemsworth; also the pied fly-catcher and young at that place—another locality for this scarce migrant, which has been chiefly noted at Wentworth Castle and Cannon Hall. A note from Mr. E. Hailstone states that on August 7th three terns, or sea swallows, were for a short time over Walton Lake, where all birds are protected as in Waterton's time. He has reported the tern in four different months this year—a curious fact as regards these “dwellers by the pathless deep.” Mr. Lister heard the willow warblers sing in the park Aug. 10th, and again in his excursion with the Rotherham Naturalists' Society Aug. 19th. in Sprotborough woods; also the whitethroat and whinchat. It is desirable that the last occurrence of migrants should be recorded. The most singular case was a swallow's nest and young in the harrier's kennel during an excursion of the Barnsley Naturalists to the house and grounds of W. Norton, Esq., J.P., Rockwood House, Denby Dale, July 24, which interesting visit is recorded more fully elsewhere. A letter from Mr. W. D. Roebuck, hon. secretary of the Y. N. U., respecting the 60 bats struck by the lightning July 17th, and brought to the ground from the decayed branch of an oak in Wentworth Castle Park.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 20th, under the presidency of Mr. Jagger. A number of boxes of insects were exhibited, the most important being those of *P. bucephala*, *P. iota*, *P. caesiata*, and a beautiful series of *A. grossulariata*, contributed by Mr. Hodgson. Mr. Wardman showed *T. batis*, taken at Saltaire, an insect new to the local record list; also *B. repandata* and *X. hepatica* from the same district: Messrs. Hyde and Perry, *Y. elutata*, *C. plantaginis*, from Baildon Moor, and *S. lunaria* from the Lake District. A nice collection of American insects was exhibited by Mr. J. Hebblethwaite, who read a paper on “The Bulb Gardens of Holland.” In the course of his

remarks Mr. Hebblethwaite referred to his recent visit to Holland, and said that although he had chosen for his subject the Bulb Gardens of Holland, he thought a more appropriate title would have been "The Bulb Fields or Farms of Holland, for with that nation the flowers which were so highly prized in this country for their attractive blooms as well as their sweet odours, were grown in acres and even in miles of fields. Mr. Hebblethwaite gave a practical illustration of the *modus operandi* of the cultivation of the hyacinth and tulip from the seeds and offsets to the mature bulb, which was explained to him by M. Vantubergen, one of the largest hyacinth growers in Haarlem.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—389th meeting, July 20th, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. B. Saynor showed *Volvox globator*, found in the fish-ponds at Bramham Park; Mr. James Abbott, the ciliary circulation in living specimens of *Alcyonella fungosa*, found near Leeds; wood sections were shown by Mr. J. W. Dixon; and Mr. F. Emsley had on view *Canthocamptus minutus* and various freshwater algæ from Bramham Park. Mr. W. B. Turner, F.C.S., F.R.M.S., showed numerous objects, especially marine algæ, sponges, zoophytes, and he demonstrated the process of reproduction in Oscillatoriaceæ. Glow-worms (*Lampyris noctiluca*) from Lindley Wood, in the Washburn valley, were shown by Mr. W. E. Clarke, M.B.O.U. A fine living blindworm (*Anguis fragilis*) taken in an orchard at Masham, coiled up with four others, was shown on behalf of Mr. James Carter. Mr. Walter Raine showed a young jay (*Garrulus glandarius*) alive, from Ryther, and Mr. A. A. Pearson exhibited two patterns of a new design for a micro-section cutter.

390TH MEETING, July 27th, the president in the chair.—A lecture was delivered by Mr. W. Barwell Turner, F.C.S., F.R.M.S., upon "Systems of Zoology, Old and New."

391ST MEETING, Aug. 3rd, the president in the chair.—Mr. W. Denison Roebuck exhibited a female lizard (*Zootoca vivipara*) which he had taken on the Gill Beck moors, near Barden, and five young ones which it had produced in captivity. Mr. Henry Lupton, M.E.S., described his entomological tour in the Isle of Arran, and exhibited his captures, including a very fine variety of *Boarmia repandata* and examples of *Dasydia obfuscata*, *Pelurga comitata*, *Plusia interrogationis*, *Platypteryx lacertula*, *Agrotis valligera*, and a very large species of *Tabanus*, or horse-fly. Mr. Henry Marsh showed *Apatura Iris*, *Arge Galathea*, *Angerona prunaria*, *Aventia flexula*, *Toxocampa pastinum*, &c., his recent captures at Chattenden woods, near Rochester; Mr. C. Smethurst, good varieties of *Bombyx callunæ*, *Arctia caja*, and *Spilosoma lubricipeda*; Mr. W. H. Taylor, *Cychrus rostratus* from Roundhay Park, a beetle previously unrecorded for the Leeds district; also *Lepisma saccharina*, taken in the meeting-room. Mr. Wm. Howgate exhibited a very large spider (living),

found at Goole among dyewoods imported from San Domingo, W. I. A discussion ensued respecting tarantulas and bird-eating spiders.

392ND MEETING, Aug. 10th, the president in the chair.—The principal object of interest was a full-grown living larva of *Attacus atlas*, belonging to Mr. H. Marsh, which had been reared by Mr. W. H. Taylor. It was hatched on the 22nd August, and spun up Aug. 17th. Mr. Washington Teasdale, F.R.M.S., showed a type slide of 60 species of foraminifera mounted by Mr. J. D. Siddall of Chester; Mr. W. L. Teasdale, various slides of lepidopterous scales; Mr. W. B. Turner, foraminifera from Lough Foyle and County Down, and slides of mosses.

393RD MEETING, Aug. 17th.—The president, Mr. B. Holgate, F.G.S., who was in the chair, exhibited for the Rev. R. Collins a stuffed specimen of the smallest known deer (*Moschus Meminna*) from Ceylon; he also mentioned some curious facts with respect to the elephant in Ceylon, on Mr. Collins' authority, whereby there appeared to be a correlation between the height of the animal and the number of its toes. A young Kandyan chief named Dunnville informed Mr. Collins that there are in the same herd various sizes of elephants, and that, when young, the number of their toes is an indication of the height which they will attain at maturity. The largest have 18, the smallest 16, while medium-sized elephants have 17. Mr. H. Marsh exhibited living larvæ of *Orgyia pudibunda* from Windermere Lake side. Mr. H. Pollard brought a fine specimen of the pearl mussel (*Unio margaritifera*) from the river Esk, at Whitby, where they are common in the shallow parts; Mr. Jas. Abbott, showed *Polypogon monspeliensis*, which he had found on rubbish-heaps near Leeds; Mr. W. Denison Roebuck specimens of *Bombus lucorum*, which had been found dead under lime-blossom at Monkstown, Dublin County, under precisely parallel circumstances with those recorded in the *Naturalist* for 1877, vol. iii., p. 40, by Mr. Varley, near Huddersfield.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, 31st July, Mr. J. Spencer in the chair.—The following botanical specimens were exhibited: *Geranium pratense*, *Linaria Cymbalaria*, *Pyrola minor*, *Sanguisorba officinalis*, *Chelidonium majus*, *Circea lutetiana*, *Empetrum nigrum*, *Andromeda polifolia*, *Drosera rotundifolia*, and others more common; also the following ferns, &c.:—*Polypodium Phegopteris* and *Dryopteris*, *Scolopendrium vulgare*, *Lastrea cristata*, *L. Oreopteris*, *Hookeria lucens*, &c.—J. OGDEN, Sec.

YORKSHIRE NATURALISTS' UNION.—The fifth meeting for 1880 was on the Bank Holiday Monday, August 2nd, at Marsden. Two main parties were formed. One, led by Mr. C. P. Hobkirk, F.L.S., and Mr. John Hirst, F.R.M.S., of Dobcross, started from Greenfield, over the moors, past Bill's o' Jack's, Diggle, Saddleworth, and Standedge by Redbrook reservoir, Mr. Hirst giving very good descriptions of the physical geology of the country traversed. The other party was led by the other local secretary, Mr. S. L. Mosley, from Lockwood, over Crosland Moor,

skirting Dungeon Wood to South Crosland, through Honley Woods to Meltham, thence past Blackmoorfoot reservoir to Deer Hill, over the moors to Wessenden Head, and down that valley to Marsden. The common rendezvous for all the parties was Blake Lee, a pleasant resort on the edge of the moors. Here the meetings were held. At the general one, Prof. W. C. Williamson, F.R.S., the president, occupied the chair. There were about 50 or 60 members present, representing 14 societies. The list of new subscribers included Messrs. T. Pape of Helmsley, A. Bear of Bradford, and P. B. Mason, F.L.S., of Burton-on-Trent. Votes of thanks to Messrs. Hobkirk and Mosley for their services as local secretaries were adopted. Mr. Thos. Hick, B.A., B. Sc., reported, with respect to the address to Mr. Darwin, that the committee recommended that it should be printed on vellum, signed by the officers of the Union, bound in a morocco case, and afterwards either forwarded to Mr. Darwin, or presented by a small deputation. The committee also thought it advisable not to charge the cost of it on the Union funds, and had opened a subscription among the members and friends. The report of the Committee was accepted, and the committee re-appointed to carry out their recommendations. Mr. Thomas Lister, of Barnsley, was chosen to act as representative of the Union at the coming meeting of the British Association at Swansea, on the motion of Mr. W. Denison Roebuck, seconded by Mr. J. W. Davis, F.S.A. The officers of sections then reported as follows:—For the Entomological Section Mr. S. D. Bairstow, F.L.S., reported that but little had been done. *Scoparia coarctalis* had been taken by Mr. C. Smethurst, larvæ of *Polia flavocincta* by Mr. G. T. Porritt and by Mr. J. P. Barrett of London (who was present as a visitor) whilst *Larentia cæsiata* and *Cidaria populata* were noticed in abundance by all the members of the section. Tipulidæ had been noticed in profusion all over the moors, and various ichneumons, including *Amblyteles fasciatorius*, had been noticed. Mr. C. P. Hobkirk, F.L.S., reported for the Botanical Section. The total number of vascular plants noted during the day was 120 among which were *Claytonia alsinoides*, *Rubus chamæmorus*, *Vaccinium Vitis-idaea*, and *Carex binervis*. Thirty-six species of mosses were observed, including *Dicranella cerviculata*, *Bartramia pomiformis*, *Atrichum crispum*, *Oligotrichum hercynicum*, *Hyocomium flagellare*, and *Hypnum ochraceum*. *Jungermannia trichophylla*, *Chiloscyphus polyanthus*, and nine other species of hepaticæ were collected. Three species of lichens were noted, *Lecidea contigua*, forma *hydrophila*, being the best. Six species of fungi were collected, including *Ascobolus Crouani*, *Fragilaria virescens*, *F. mutabilis*, *Pinnularia viridis*, *Stigeoclonium protensum*, and six other species of algæ were gathered. As botanists were forbidden to go on the moors, many plants which occur in the district were not seen.—W. D. R.—[No other reports having been furnished, we must refer our readers to the excellent account appended to this issue, through the kindness of the proprietor of the *Huddersfield Weekly News*.—Eds. Nat.]

Diary.—Meetings of Societies.

September 1. Wakefield Naturalists' Society.

- „ 4. Yorkshire Naturalists' Union.—Excursion to Market Weighton.
Local Secretary : W. N. Chessman, The Crescent, Selby.
- „ 7. Liversedge Naturalists' Society. Bishop Auckland Naturalists' Field Club. Leeds Naturalists Club, &c.—Lecture on
"The General Anatomy of Insects," by John Stubbins,
F.L.S., &c., of Halifax.
- „ 8. York and District Naturalist Field Club.
- „ 9. Dewsbury Naturalists' Society.
- „ 10. Huddersfield Scientific Club.
- „ 11. Local Naturalists' Association.—Excursion to Hartshead.
Local Secretary : James Rothery, Millbridge, Liversedge.
- „ 14. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
- „ 18. North Staffordshire Naturalists' Field Club.—Excursion to Cat-and-Fiddle. Leader : Mr. Kirkby.
- „ 20. Huddersfield Naturalists' Society. Manchester Cryptogamic Society.
- „ 21. Leeds Naturalist's Club, &c.—Botanical and Microscopical Sections.
- „ 27. Lancashire and Cheshire Entomological Society.
- „ 28. Leeds Naturalist's Club, &c.—Vertebrate and Entomological Sections.

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PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire ; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons ; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding" ; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S. ; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S. ; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LXIII.

OCTOBER, 1880.

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TO OUR SUBSCRIBERS.

Subscribers are reminded that subscriptions to Vol. VI. were due in August, and those who have not already done so are requested to forward Stamps or P.O.O. for the amount (4/-) at once.

We regret to say that our circular has not produced anything near the number of additional subscriptions we asked for. We are, therefore, compelled to keep to our 16pp.—*Eds. Nat.*

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Original Articles.

THE RISE OF THE LITERATURE OF ENTOMOLOGY.

BY WILLOUGHBY GARDNER.

(Concluded.)

WE now come to the last class of books, in which we include all those giving accounts of individual species. Naturally the insects taken most notice of are the bees, and therefore we find frequent allusions to them among the writers of the various countries of Europe. Beginning at home, THOMAS HILL in his work on gardening, ⁽³¹⁾ has a chapter on bees; in Spain, TORRES fills an octavo on the keeping of bees. ⁽³²⁾ Some time previously, in Germany, STANHUFF devoted a whole quarto to the habits of bees, and the allegories suggested by them. ⁽³³⁾ Silkworms, also, on account of the practical value of the silk they produced, claimed some attention, and accordingly we find SERRES ⁽³⁴⁾ at Paris and London, LIBANUS ⁽³⁵⁾ in Germany, and TELLIER ⁽³⁶⁾ in Paris again, publishing works on their history and culture; and in London, in 1609, an anonymous writer fills a large volume with the history of the mulberry tree and the silkworm ⁽³⁷⁾. At this time also the ants obtained a small volume on their history by JEROME WILDE ⁽³⁸⁾; Aristotle's theory about wasps was compiled in a work by CAGNATUS, ⁽³⁹⁾ a naturalist of Verona; and a curious volume was published a little later by an anonymous writer. ⁽⁴⁰⁾ Last, but not least, was JACOB HOFENAGEL's book called "Various Illustrations of Flying Insects, illustrated most accurately from life." ⁽⁴¹⁾ This book—which has no

N. S., VOL. VI.—OCT., 1880.

(31) A Briefe Treatyse of Gardenynge; teaching the apt dressing, sowing, and setting of Gardens, with the remedies against such beastes, wormes, flyes, etc., that commonly annoy gardens. To this is annexed the maruelous gouvernement, propertie, and benefite of the Bees, with the rare secret of honey and of the waxe; in 4to, London, 1574, etc.

(32) Tratato de la cultivacion y cura de las colmenas; in 8vo, Alcala, 1586.

(33) Orat. de principiis proprietatibus apium et allegoriis quae in harum contemplatione occurrunt: in 4to, Vittenb., 1556.

(34) La Cueillette de la Soie pour la nourriture des vers qui la font; in 8vo, Paris, 1599.

(35) Historia Bombycum, in 8vo, Franckf., 1599.

(36) 1. Brief discours concernant la manière de nourrir la vers à sois; in 12mo, Paris, 1602. 2. Mémoires et Instructions pour l'établissement des mûriers et l'art de faire la soie en France (with figures); 4to, Paris, 1603.

(37) Instructions for the increasing of Mulberry Trees and the breeding of Silkworms, and the making of Silk in this Kingdom; in 4to, London, 1609.

(38) De Formica liber unus, 8vo, Ambergæ, 1615.

(39) Variorum Observationum libri IV. in 8vo, Romæ, 1581, and other editions.

(40) Laus Pulicis in vino se suffocaturi versiculis anacreontis inclusa; in 12mo, Schleus, 1631.

(41) Diversae Insectorum volatilium Icones, ad vivum accuratissime depictae; in 4to, Francofurti ad Mænum.

letterpress, and which in the copy in the British Museum forms part of a larger work on Natural History generally,—is certainly well described by the latter part of its title, for the clearness of the figures is a most conspicuous feature. The part on insects contains fourteen plates, and was published at Frankfort A.D. 1630.

We must now turn our attention again to the M.SS. left by Thos. Muffet. According to A. Wood, in his "*Athenæ Oxoniensis*," a few imperfect copies of the "*Theatrum*" were published by Laur. Scholzius in 1598, but of these I can find no mention elsewhere. Be that as it may, they were imperfect copies, and only one or two were printed, so the M.SS. practically lay by idle until they came into the hands of Sir Theod. de Mayerne, who published them at London in 1634, under Muffet's original title of "*INSECTORUM SIVE MINIMORUM ANIMALIUM THEATRUM*." Thus we see, with the appearance in print of this book, Conrad Gesner's writings on insects at last saw the light of day, about a century after their origin, and after passing through many vicissitudes, having changed hands as many as five times. Such was the struggle this study went through in its early days.

Thomas Muffet has well been called the father of Entomology, and certainly he did a great deal for this particular branch of Natural Science, for his book is most comprehensive, containing as it does a history of each order of insects, and recapitulating everything that had been discovered on the subject previously. We must remember, also, that to compile a work like Muffet's was no light task in his day; it would no doubt require endless research in numerous foreign libraries to obtain the various authors he quotes from—for books, as we know, were very few and far between in those times, very different from our own, when we can get almost any volume we may desire in our large public libraries. Muffet enters most thoroughly and heartily into his work; he is not content merely to record the few bare facts he could glean from previous authors concerning the different species of insects, as other writers had done before, but in each case, by means of his own and his friends' observations, he strives to arrive at a practical reason and definite use for all the phenomena he observes. True, his conclusions may not have been entirely correct, but even then they formed a basis from which subsequent investigators could start with additions and corrections, till at last the amount of certain knowledge which we possess at the present day has been arrived at. I may here mention a statement of Muffet's which, though a gross error, has had a long-lived reputation.

He says that when the pupa changes into the imago, the head of the pupa becomes the tail of the imago, and *vice versa* ! This certainly seems a strange idea for such an entomologist as Muffet to have taken into his head ; but although Swammerdam, in his great work in 1669, took the trouble to disprove the statement at some length. Muffet's theory has been copied by compilers of works on Natural History from one to another, without scruple, for over 200 years, and I daresay many have, like myself, met with it in some of the so-called popular books on Natural History, even at the present day—Muffet's name alone having been taken as a sufficient guarantee for the truth of such an absurd assertion.

Thus we have endeavoured to trace the rise and progress of Entomological Literature from unknown writers before the time of Aristotle (who was born nearly 400 years before the Christian era) down to the publication of Muffet's "*Theatrum Insectorum*," A.D. 1634. We have seen that although insects were by no means unnoticed before, Muffet's "*Theatrum*," which was printed at *London*, was the first separate work, on all orders of insects, published to the world. England, which has been, and we hope ever will be, first in most things, can thus claim to have produced the earliest important work on Entomology, the book before us.

I fear, now I have come to a close, that many will say (rightly too, perhaps) that these notes are more fit for an Antiquarian than for an Entomological Society ; but still I trust it has not been unprofitable to devote a little time and trouble in tracing out the early history of our interesting study.

N.B.—The author will be glad to receive any corrections or additions to the above.

ANCIENT PEAT BOG NEAR OLDHAM.

ON Monday evening, the 13th Sept., about eighty ladies and gentlemen met in front of the General Post Office, Greaves-street, at the invitation of the Oldham Microscopical Society, and led by Mr. James Nield, proceeded to the very interesting section of boulder clay enclosing a bed of peat which has recently been uncovered near Rhodes Bank. Mr. Nield entered into various explanations as to the peat, after which the company adjourned to the Union Club, where Mr. Nield read the following paper :—

"The section before us, though not a large one, is very varied and full of interest. In the depth of 14 feet we have two thick beds of

drift, with partings of fine clay, and, midway in the section, we have a well-defined bed of peat, with a maximum thickness of about 18 inches. Another bed of peat, less clearly defined, and not so pure as the former, is likewise present, the two beds having beneath them a band of exceedingly fine clay, of a bluish grey colour, which evidently corresponds to the "seating" or "floor clay" which is so invariable an accompaniment of our coal seams. The beds of drift that enclose the peat are alike in some of their main features, but very unlike in others. In both, boulders, principally of foreign extraction, are in great abundance, and give a striking appearance to both beds. In the bed beneath the peat we have one or two bands of fine clay, coarse sand, or grit pebbles, and boulders, while, as you will see, the upper one, with some little variation, is made up of a very uniform arenaceous clay, and a great number of boulders—a somewhat indifferent and unprofitable material for making bricks.

"The section of 14 feet before us gives but an imperfect idea of the thickness of these deposits as they existed at the time of their final appearance above the sea, and we have not the means of determining this thickness with any degree of exactness; but, while remembering that the brook which runs close by has worn out what we now know as the valley of the Medlock, let us draw an imaginary line at right angles to the trend of the valley, from, say Glodwick on the south to Yorkshire-street on the north, and I think we may then hazard an opinion that the bed of peat has at a former period in the remote past been capped by from 50 to 100 feet of characteristic boulder clay, the upper beds being known to the geologist as the "upper drift," and the lower beds—stratified sand and gravel, with pebbles and boulders—as the "middle drift," the lower and other deposits being wanting in this neighbourhood so far as is known.

"These deposits are said, with good reason, to be of marine origin; that the clay is but the half-dried mud of an old sea bottom; that this clay, and a great per-centage of the boulders, pebbles, gravel, and sand have been derived from distant districts, more or less northerly from our present standpoint; that these were brought and dropped here, where we find them, by passing icebergs, assisted by shore ice sailing over the latitude in which we now live, and melting in the slightly warmer waters and balmy breezes during the period known as the "Ice Age," when the tops of our highest hills alone stood above the level of a glacial sea, and when the plants now met with only within or about the line of perpetual snow were denizens of this part of our country, when the now extinct mammoth and the hairy rhinoceros, the

now living grizzly bear of North America, the Arctic fox, the tailless hare, and reindeer, shared with primeval Britons the meagre fare of an uncharitable soil. We can form no conception of the time that has elapsed since these events and changes took place, but you will agree with me that that time must be immense, if you will bear in mind that since their occurrence sea and land have changed their relative level, the rigours of the climate have been softened, the configuration of the country has been altered, and a general change in the plants and animals has been effected, these latter having migrated to more northern latitudes, or where the conditions of cold, moisture, &c., such as their nature loves and requires, can still be found. Appearances of great physical changes, I think, are plainly visible in the section before us. The bed of gravel enclosing waterworn pebbles and boulders, at the base of the section, may be taken to represent a shallow water or shore deposit, indicating a thickening of the accumulation, or, probably, a rising of the land generally. At this point a pause in the upward tendency seems to have ensued. This pause was of sufficient duration to allow of the uninterrupted growth of innumerable generations of aquatic and other plants, whose buried remains have built up the bed of peat which we have this evening come to see. At length the further growth was, by some means, arrested. I know the danger I incur in hazarding an opinion as to the nature and extent of these changes, but will venture to suggest that the period of growth was finally closed by the slow and gradual subsidence of the area, which subsidence continued till the thickness of say 100 feet of subsequent deposits was attained. This bed of peat differs from other beds with which we are acquainted, in this, that it is infinitely older than the more familiar examples. In proof of its greater age let us remember that, while the more recent peat growths are invariably found *above* the boulder clay, the example before us is *beneath* the identical beds, thus proving its seniority.

“It is quite impossible to determine, with any degree of accuracy, the nature and the number of species of plants whose remains have gone towards the making up of this bed of peat. The conditions for preserving them have not been sufficiently favourable, and the time that has elapsed since they lived has been too great for the solution of the problem. With the aid of the microscope, however, I have thus far been enabled to recognise some four or five species of mosses only, with a few thin stems exhibiting exogenous structure, and belonging to a higher order of plants, a few leaves of what I believe to be grasses, and to give to Cæsar Cæsar’s due, let me add that my eldest son has

been so fortunate as to find one of the wing cases, and one of the thoracic plates of a beetle of yet unknown affinities. The labour of further investigation, and of identifying the mosses, if that be possible, I have placed in abler hands—the hands of one of our society's honorary members, Mr. John Whitehead.

“It would, I think, be unreasonable, and scarcely in accordance with the teachings of geological science, to expect that the plants under examination would be identical with those to be met with in the latitude of Oldham at the present day. When these mosses, &c., adorned the earth with their bright green cushions, we had perhaps not exactly an arctic climate, but a sub-arctic one. Our summers were short and our winters were long: the higher hills were covered with snow the year round; the valleys sent down their glaciers, the vegetation was scanty, and had but a limited area upon which it could find shelter and sustenance; the sea shore was ice-bound in winter, and in summer the surrounding waters were chilled by the presence of innumerable icebergs which, partly melting, here dropped their heterogeneous burden of clay, boulders, pebbles, gravel, and sand, on the then sea bottom, now the land upon which we stand to look, to think, and to wonder. Should it be possible to identify these beetles, mosses, stems, roots, &c., with species now living, I will venture to predict that it will be found that their present habitat is in more northern latitudes, or at a considerable altitude on our mountains, where alone they meet with the temperature and other conditions that they require.”

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Continued.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

ALISMACEÆ.

Butomus umbellatus, L. (A) Cors ddygai; (C) ditches near Llandudno.

Alisma Plantago, L. Abundant in both counties.

A. ranunculoides, L. (A) Cors ddygai, &c.

A. natans. (A) Cors ddygai; also between Towyn Capel and Porth Dafarch, near Holyhead.

Triglochin palustre, L. Frequent in both counties.

T. maritimum, L. (A) Near Menai Bridge, &c.; (C) between Aber and Llanfairfechan, &c.

ORCHIDACEÆ.

- Malaxis paludosa*, Sw. (C) Near Llanberis.
Epipactis latifolia. (A) Near Red Hill, Beaumaris; (C) frequent about Bangor, &c.
E. ovalis, Bab. (C) South-western cliffs of Great Ormshead. Flowers latter end of July.
E. palustris, Sw. (A) Cors Hendre, near Pentraeth.
Cephalanthera grandiflora, Bab. (C) Near Dolbadern Castle, Llanberis.
Listera ovata, Br. (A) Plas Newydd woods, &c.; (C) plentiful in Penrhyn Park and Bangor, and between Gorad Gyt and George Hotel, &c.
Listera cordata, Br. (C) Near Trefriw.
Spiranthes autumnalis, Rich. (A) Towyn Capel, near Holyhead; Lleiniog Castle meadow, &c.
Orchis Morio, L. (A) Near Penmon Church, &c.; (C) near Capel Ogwen, Penrhyn Park.
O. mascula, L. Common in both counties.
O. maculata, Do. do.
O. latifolia. Frequent in both counties.
O. pyramidalis, L. (A) Towyn Capel, near Holyhead, &c.; (C) Great Ormshead, between Bangor and Menai Bridge.
O. conopsea, L. (A) Cors Hendre, Pentraeth, &c.; (C) between Goryad Gyt and George Hotel, Bangor.
Habenaria albida, Br. (C) Nant Francon, &c.
Aceras anthropophora, Br. (C) Near Bishop's Mill, Bangor.
Ophrys muscifera, Huds. (A) Near Llanddyfnan, &c.; (C) on the declivity near George Hotel, Bangor.

IRIDACEÆ.

- Iris Pseudo-acorus*, L. Abundant in both counties.
I. fœtidissima, L. (A) Near Friars, Beaumaris, and Puffin Island.

AMARYLLIDACEÆ.

- Narcissus Pseudo-narcissus*, L. (A) Near Beaumaris &c.; (C) Bishop's Park, Bangor.

DIOSCORIDACEÆ.

- Tamus communis*, L. Abundant in both counties.

LILIACEÆ.

- Paris quadrifolia*, L. (C) Treborth Park, near Menai Bridge.
Polygonatum multiflorum, All. Common in cottage gardens in both counties.
Ruscus aculeatus, L. Not uncommon in both counties.

- Lloydia serotina*, Reichenb. (C) On the cliffs, Twll du. I may here note that the best time to get it is from the 10th to 18th June.
- Ornithogalum umbellatum*, L. (C) Bishop's Park, Bangor.
- Scilla verna*, Huds. (A) Abundant in Towyn Capel and along the east coast, &c.; (C) abundant on the Great Ormshead.
- S. nutans*, Sm. Abundant in both counties.
- Allium oleraceum*, L. (A) Pencraig wood, near Llangefni.
- A. vineale*, var. *c. compactum*. (C) Abundant Siliwen Bathing Place, Bangor.
- A. ursinum*, L. (A) Abundant in Mill Dingle, Beaumaris, &c.; (C) Tan yr allt wood, Bangor, &c.
- Narthecium ossifragum*, Huds. Abundant in bogs and on wet moors in both counties.

JUNCACEÆ.

- Juncus communis*, Mey. Abundant in both counties.
- J. glaucus*, Ehrh. Do. do.
- J. articulatus*, L. Do. do.
- J. obtusiflorus*, Ehrh. (A) In a dingle south-west Ty Fry, near Pentraeth.
- J. squarrosus*, L. (A) Cors ddygai; (C) Cwm Idwal.
- J. bufonius*, L. Abundant in both counties.
- J. maritimus*, Lam. (A) Red Wharf, &c.; (C) between Aber and Llanfairfechan, near the beach, &c.
- J. acutus*, L. Do. do. do.
- J. biglumis*, L. (C) Cwm Idwal, and near Bochlwyd lakes.
- J. triglumis*. (C) Near Llyn Cwm.
- Iuzula pilosa*, Willd. Abundant in both counties.
- I. sylvatica*, Bechen. Do. do.
- I. campestris*, Br. Do. do.
- I. spicata*, D.C. (C) Ysgolion duon, Llyn Cwm.

CYPERACEÆ.

- Schoenus nigricans*, L. (A) Abundant in Cors ddygai, &c.
- Cladium Mariscus*, Br. (A) Plentiful in Cors Hendre, near Pentraeth.
- Blysmus rufus*, (A) Towyn, Aberffraw, &c.
- Scirpus acicularis*, L. (A) On the margin of Coron lake and Maelog lake, &c.; (C) Idwal lake.
- S. palustris*, L. Frequent in both counties.
- S. multicaulis*, Sm. (A) Near the Reservoir, Holyhead.
- S. cæspitosus*, L. (C) Cwm Idwal, Llanberis, &c.
- S. fluitans*, L. Not uncommon in both counties.

- S. setaceus*. L. (C) Near Bishop's Mill, Bangor.
S. Savii, S. and M. (A) Porth Pestill, Holyhead, &c.
S. lacustris, L. Common in both counties.
S. maritimus. (A) Under Wern Llanddona, near the beach.

(To be continued.)

Rainfall for August.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·71	10	20·93	* 20·19	7	1·14
HALIFAX...(F. G. S. Rawson)	360	1·81	9	56·67	29·99	...	...
BARNSLEY ... (T. Lister) ...	350	1·89	10	21·77	22·99	7	1·02
INGBIRCHWORTH (do.)	853	2·03	13	27·00	28·07	7	1·18
WENTWORTH CASTLE (do.)...	520	1·91	9	21·09	23·89	7	1·23
GOOLE ... (J. HARRISON) ...	25	1·93	9	18·51	18·69	6	0·85

* This is the average to date for 14 years, 1866-79.

CORRECTION.—The amount of "heaviest fall" at Goole during the month of July was '63, not 6'3, as stated in last month's *Naturalist*.—J. HARRISON, Goole, September 7th, 1880.

Short Notes and Queries.

THE CURLEW AT LINDLEY.—A few days ago Mr. Joseph Firth, of the Red Lion, shot a pair of curlews, "in immature plumage," at one shot, in a field close to Lindley, near Huddersfield.—C. C. HANSON.

WATER-RAIL BREEDING NEAR SELBY.—I have been informed by Mr. Pulleyn, of Selby, that six eggs of the water-rail (*Rallus aquaticus*) were brought to him during the spring of 1879; they had been taken from a nest found in a drain near Selby. Though water-rails are frequently obtained in the neighbourhood, I think this is the first time it has been noticed breeding. I also saw in Mr. Pulleyn's possession a pair of spotted crakes that had been shot near Selby last winter, and a hawfinch that had been obtained in the neighbourhood last May.—WALTER RAINE, Leeds, Sept. 15th.

SWALLOWS IN WEST VALE.—The violent storm of wind and rain on Wednesday night appeared to hasten the departure of the swallow tribe. About eight o'clock this morning they passed over West Vale, Greetland,

by hundreds ; they came in flocks, then a few stragglers, to be followed by flocks again, and so they continued for an hour. The majority were martins, the rest swallows, and along with the last batch was one solitary swift. I never observed a swift so late before ; they flew low and straight forwards, just skimming the house tops. Their course was east.—C. C. HANSON, Sept. 16th.

Vanessa Antiopa AT MARGATE.—On August 18th, I took a beautiful specimen of *Vanessa Antiopa* at Margate. I captured it half a mile from where I first saw it, and after having lost sight of it for an hour and a half.—J. P. BARRETT, London, August 23rd.

Catocala fraxini NEAR BARNSELY.—I have the pleasure to inform entomological readers that a beautiful specimen of *Catocala fraxini* has been taken at sugar by Dr. White, near Barnsley.—JOHN HARRISON, 7, Victoria Bridge, Barnsley.

Coremia munitata.—In the August number for 1880, of the *Naturalist*, page 12, I noticed a short account of the proceedings of the 386th meeting of the Leeds Naturalists' Club. Mr. C. Smethurst exhibits a good list of lepidoptera, taken during a visit to Wharnccliffe Woods ; amongst them I noticed *Coremia munitata*. May I ask Mr. Smethurst if he is correct with that species ?—because we visited Wharnccliffe about the same time, and took every species shown by him at the above meeting, but in place of *Coremia munitata* we took *Coremia propugnata*. If Mr. Smethurst really took *Munitata* at Wharnccliffe, it will add another species to our local (Barnsley) list, and for that reason I write you. Perhaps Mr. Smethurst will reply in next number of the *Naturalist*.—JOHN HARRISON, 7, Victoria Bridge, Barnsley.

LOCUSTS IN YORKSHIRE.—The locusts have again put in an appearance, the first since 1876, that I have heard of. The first specimen I saw was one which was taken at Goole, on the 3rd of September, and which Mr. T. Bunker kindly allowed me to retain a few days for examination. It seemed to me that it was of the same species (*Pachytylus cinerascens*) as those which formed the flight of 1876. On the 2nd of September, one (which I have also had under my eye by the kindness of the captor) was taken in Round Street, Bowling Old Lane, Bradford, by Mr. Terry Holmes. At the meeting of the Leeds Naturalists' Club on the 7th Sept. I saw one which had flown into the window of a house in Crimbles Street, Leeds, and was shown by Mr. Raine, on behalf of his friend Mr. Briggs. Mr. Raine has since informed me of another, which has been taken near Meanwood Street, Leeds, but this I have not seen. Mr. Thomas Lister tells me one has been taken near Barnsley, and the newspapers report one occurring at Scarborough. On hearing of these, and knowing that this species always comes from the East, I asked Mr. Clarke to write to his friend Mr. Lawton and ascertain whether any had appeared in Holderness, which district is almost certain to produce locusts. The results of these inquiries were precisely what I expected, for I learnt that

several had occurred about Easington. The specimens which I have seen varied slightly in colour from the locusts of 1876, and did not by any means exhibit so much of a tendency to green coloration; they were brown or leaden-grey in tinge. The cause of the visitation is obvious. The weather—the gloriously fine and warm sunny days of the last weeks of August and the first week of September, the warmest days we have had this year—just suited these insects, assisted their development, and facilitated their wanderings. To my mind there is just a shade of ground for surmising that it is possible that the locusts breed in the East Riding, if any of our members will endeavour to investigate the point, and try to find the larvæ.—WM. DENISON ROEBUCK, Leeds, Sept. 17th.

LOCUST AT BRADFORD.—A very fine specimen of the above was taken in a cricket field adjoining Carlisle Road, Manningham, Sept. 6th. It measured $4\frac{3}{4}$ inches from tip to tip of the wings, and is now in my possession.—JOHN FIRTH, Bradford, Sept. 15th.

Orthodontium gracile, Wils.—In the “Revue Bryologique,” 1880, page 84 (Sept.), the Abbé Boulay points out an unaccountable error respecting the peristome of this moss, made by its discoverer the late Wm. Wilson. In the “Bry. Brit.” we read, “Outer teeth.....nearly twice as long as the narrow processes of the inner peristome.” In the “Bryol. Eur.” the same statement is made: *Cilia duplo breviora*; Mueller’s Syn., is the same: *peristomii dentes.....interni dimidio breviores*, whilst Schimper quite recently in his Syn. Musc. Eur., Ed. II., p. 389, repeats the same thing: *interni processus multo breviores*. M. Boulay states that the first peristome of this moss, which he examined from Guipavas, shewed the interior processes quite as long as the exterior teeth, at times even surpassing them, which caused him at first to doubt his determination of the specimen.* But on referring to authentic specimens, viz.: No. 677, of Rabenhorst’s Bryotheca Europæa, gathered by Mr. Curnow in Cheshire, he found the internal processes “terminating in long cilia equalling or surpassing the external teeth.” The strangest thing about it is, that, Wilson’s figure on pl. xlvii., is so far contrary to his diagnosis that the teeth are of equal length, and in two of the three figures of the peristome the internal are the longer! Having thus had my curiosity aroused, I referred to some good fruiting specimens in my herbarium, gathered by my late friend Mr. G. E. Hunt, at Alderley Edge, in 1863, and I find they agree with Wilson’s figure and M. Boulay’s remarks. How Mr. Wilson, who was generally so careful and exact in his descriptions can have made such an error, is strange. The Abbé conjectures that the original specimens must have been in an imperfect state and either not fully developed or too far advanced; and the moss being very rare, authors who have subsequently written upon it contented themselves with reproducing the

* The specimen above referred to was gathered by M. Tanguy, Jun., on the soil of a talus at the side of the Fontaine de St. Euéan, at Larvez en Guipavas (Finisterre). This is the first time it has been gathered in France or out of England, where it has only been recorded from Cheshire and Yorkshire.

the original description. However this may be, he says, the diagnoses ought to be modified as follows: *processus peristomii interni dentibus externis æquilongi, humiditate conniventibus, apice contiguis.*" Will some of our Cheshire bryologists examine fresh specimens when fully ripe, and thus confirm these remarks if they find them correct?—CHAS. P. HOBKIRK, Huddersfield, 10th Sep., 1880.

Campylopus introflexus, Brid.—(*C. polytrichoides*, De. Not.)—has been found in fruit at Oporto, in Portugal, by an English botanist, Mr. Isaac Newton. Although this moss grows in several places in England and Ireland, as well as in various foreign countries, we believe this is the first time it has been found fruiting in Europe.—C. P. H.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Sept. 14th.—The entomological section reported several species to the district, of which the principal were *Sesia tipuliformis*, *Aplecta occulta*, *Catocala fraxini*, and the larvæ of *Notodonta dictæoides*, *Cymatophora fluctuosa*, and *Cossus ligniperda*. In ornithology, information from Barnsley and neighbouring districts has been received. Rev. W. Elmhirst reports the ring-ousel in his garden at Elmhirst in May; it had never previously been seen nearer than the moors. In an excursion of the Rotherham Naturalists' Society, Aug. 18th, about Conisborough and Sprotborough, several birds were observed, as—swallows and martins with young, whitethroat, whinchat, daws, and the barn owl. On the occasion of Mr. Lister's attendance as representative of the Yorkshire Naturalists' Union at the British Association Meeting held in Swansea (where he took part in several discussions interesting to naturalists), he noticed several birds on the coasts and inland—the herring, the lesser black-backed, kittiwake and common gulls, the kestrel and several migrants. On Aug. 27 Mr. Ed. Hailstone writes—"General congregation of swallows preparing for departure." On the 31st, swallows and martins returned in thousands over Walton Hall and lake; on the 3rd Sept. the main body departed. Five herons were seen daily, for ten days, fishing on the borders of the lake; unfortunately they have not bred there since Waterton's time. Sept. 6th, he records the night-jar, in a tree near the grotto. Mr. Lister saw the barn owl flying in broad day over the same place, Sept. 11th. The place where the wood or tawny owls sit was pointed out. The chiff-chaff and willow-warbler were heard Sept. 13th, and flocks of sand martins were seen over the Calder on the 15th. Mr. H. Garland, of Woodhall, reports the landrail Sept. 5th. The grey flycatcher and whinchat are reported by Mr. W. Salter near Ackworth School, first week in September. Fifteen Canadian geese flew up the Dearne valley to Bretton lake, Sept. 17th. Three herons seen there Sept. 4th, and kingfishers on the lake and by the Dearne.—T. LISTER.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, at West Vale, on the 6th inst., the president in the chair.—There was a good table of autumnal flora, which were named by Messrs. C. C. Hanson and J. Fielding. Mr. A. Kippax showed yellow barred burying beetle, *Necrophorus vespillo*.—W. H. STOTT, September, 1880.

HUDDERSFIELD SCIENTIFIC CLUB.—August meeting, Mr. S. L. Mosley, president, in the chair.—Mr. George Brook exhibited some large petrified specimens of *Hypnum commutatum* from Kisdén Force, Swaledale; they were completely calcified and in splendid condition. The chairman shewed an educational entomological collection which, when complete, will embrace all orders of insects, with printed explanations, &c.; it was greatly admired, the diptera especially being very good. Mr. G. T. Porritt, larvæ of *Cosmopteryx Drurella*, received by him that day from the south of England; also a series of *Pterophorus trigonodactylus*; Mr. J. B. Littlewood a species of bird spider, found in a chest of tea from China, on the 10th inst. With the aid of the microscope Mr. Brook also shewed the following algæ:—*Edogonium capillare* in conjugation; *Mastigonema orsinianum* from Anglesea (see Field, July 31st, 1880); *Chantransia investiens* parasitic on *Batrachospermum moniliforme*; *Hydrocytium obtusum* from Bangor; *Batrachospermum helmentosum* from Lough Fea, Ireland; *Vaucheria geminata* and *Nitella opaca* from Armagh.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—394th meeting, Aug. 24th, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. H. Pollard showed Australian ants, and eggs of British birds. Mr. John Grassham was also an exhibitor of eggs. Mr. W. Howgate showed various exotic animals taken alive in a cargo of logwood at Goole, imported from San Domingo; these included a gecko lizard, scorpions, centipedes, millepedes, and spiders of the genera *Phrynus* and *Mygale*. Mr. W. Barwell Turner, F.C.S., showed the tracheæ of a centipede, spiracles of *Dyticus marginalis*, and the larva of an *Elater*. Mr. J. W. Dixon exhibited numerous microscopic slides, including a male house spider (*Ciniflo similis*). Mr. Roebuck showed *Sirex gigas*, taken in Leeds. Mr. John Grassham had a batch of feeding larvæ of *Orgyia fascelina* from Skegness, where they feed on sea-buckthorn (*Hippophaë rhamnoides*). Mr. Henry Lupton, M.E.S., exhibited *Cidaria immanata*, *C. pruinata*, *C. miaria*, *Larentia didymata*, and larvæ of *Odontopera bidentata* from Chapel Allerton. Mr. C. Smethurst showed *Ypsipetes elutata* and *Cosmia trapezina* (Scholes), *Plusia chrysitis*, *Cidaria fulvata*, and *Hypena proboscidalis* (Ledstone), *Larentia didymata* (bred, Nicklefield), *Xanthia citrigo* (Farnley, near Leeds), *Noctua baja* (Mean Wood), *Tortrix Forsterana* (Burley, Leeds), *Ebulea sambucalis* (Honley), *Scoparia murana* (Honley), and *S. coarctalis* (Blake Lee).

395TH MEETING, August 31st, the president in the chair.—Mr. W. Barwell Turner, F.C.S., read a paper entitled "A few remarks on Fish Parasites." In illustration he exhibited a number of specimens, and

an album of most exquisite drawings by himself. Messrs. Jas. Abbott, Washington Teasdale, F.R.M.S., and F. Emsley also assisted to illustrate by showing specimens. The genera shown included *Caligus*, *Argulus*, *Pandarus*, *Lerneosoma*, and other siphonostomatous crustacea. Mr. H. Pollard showed heart urchins from Saltsburn-by-the-Sea, various samples of seeds, and an abnormal specimen of *Helix nemoralis* from Oulton. Mr. E. E. Prince showed neuropterous larvæ, unnamed; and Mr. Henry Marsh a giant cockroach (? *Blatta gigantea* or *B. Americana*) taken in Leeds. On behalf of Mr. A. Clapham was shown a sparrow-hawk, from Sheriff Hutton.

396TH MEETING, September 7th, the president in the chair.—Mr. Jno. Stubbins, F.G.S., of Halifax, delivered a lecture on “The General Anatomy of Insects,” which he illustrated with a oxyhydrogen lantern and slides. Two locusts were shown, and *Sirex gigas*, taken in New Leeds, by Mr. Percy Alexander.

397TH MEETING, September 14th, the president in the chair:—A Bradford locust was exhibited; also several dragon flies (*Æschna*). Mr. W. H. Hay showed leaves of blue gum tree. Mr. H. Pollard brought *Chiton cinereus*, common in rock pools on the Whitby coast.—W. D. R.

MANCHESTER CRYPTOGAMIC SOCIETY.—Meeting, 16th of August.—Dr. Carrington, president, exhibited specimens of *Pallivincia Blytti*, (Lindb.), and the *Morekia Norvegica* (Gott) which had been sent to him by Mr. Sadler, of the Edinburgh Botanical Gardens. The latter specimen was in a growing state, and had recently been found in Scotland. It was technically described by the president, and compared with its new ally, *Jungermannia Hibernica* (Hook). The hon. secretary also exhibited growing specimens of male plants of *Dumortia irrigua*, which had been collected by Mr. Curnow, at Ilfracombe, and a number of the rarer mosses which had been collected during a recent excursion to the Breadalbane mountains. Amongst them it is interesting to record that *Leskea rufescens* and *Mnium spinosum* were found in fruiting condition. *Bryum demissum*, *Dissodon splachnoides*, and the rare fern *Cystopteris montana* were amongst the other rarities brought home. The remainder of the mosses were reserved for future examination and discrimination. Mr. W. H. Pearson laid upon the table specimens of *Jungermannia lurida* (Dmrt.) collected by himself and Mr. Whitehead, at Woodhead; also *Scapania umbrosa*, from the same locality; and *Gymnomitrium obtusum*, a new species described by Prof. Lindberg. This has been collected by Messrs. Byrom, Neild, and Pearson on Snowdon, June, 1880. Mr. Thomas Entwistle, of the Botanical Gardens, called attention to four interesting cyptogamic plants which he had recently received. They had been collected in the Kurum Valley, Afghanistan, by Dr. Aitcheson last year, and were as follows:—*Equisetum elongatum*, *Bartramia calcarea*, *Botrychium lunaria*, and the pretty *Selaginella sanguinolenta*.

YORKSHIRE NATURALISTS' UNION.—The last excursion of the season took place in the East Riding on the 4th Sept., and was well attended by East Riding naturalists. The place fixed was Market Weighton for the investigation of Londesborough Park, Holme Woods and Houghton Moor. Besides numerous small parties three main routes were followed. The botanists worked from Holme Station, by Houghton Moor to Sancton and Market Weighton. Mr. Frank Parkinson conducted a numerous party to Londesborough, the parks, gardens, fishponds and woods, thence to Goodmanham and back by the Springwell Brook to the meeting place. Mr. Matthew Foster of Sancton, one of the local secretaries, conducted the geologists in a southward direction. The day was sunny and cloudless, very fine and warm. The meetings were all held at the Londesborough Arms Hotel. At the general meeting the Rev. William Fowler, M.A., vice-president, occupied the chair. Eleven societies were found to be represented, sixteen being absent. There was a good individual attendance, about 70 or 80. The minutes were taken as read, for want of time. The Hull Field Naturalists' Society was admitted into the Union. Messrs. W. Hodgson and Jno. Key of Malton, Alfd. Harker and B. Carlill of Hull, and Mr. Foster Parkinson of Market Weighton, were thanked for becoming subscribers. Numerous donations to the library from Messrs. G. T. Porritt, F.L.S. (Entomological Transactions for 1879, &c.), Thos. Lister and Matthew Foster (two valuable MS. sections of the East Riding oolitic rocks) were also acknowledged by a vote of thanks. Thanks were also voted to Messrs. W. N. Cheesman and M. Foster, the local secretaries; to their coadjutors; and to Messrs. J. Young, H. Stourton, C. Langdale and Rev. J. Blow, for permission to visit their estates, on the motion of Mr. J. T. Atkinson, F.G.S., of Selby, seconded by Mr. E. Hunter, F.C.S., Goole. The Sectional Reports were then given as follows:—Fifty species of cryptogamic plants were seen, consisting of six species of vascular cryptogams, twenty-two mosses, six lichens, two hepatics, and fourteen fungi. Among the latter were *Amanita pubescens*, *Lepiota procerus*, *Paxillus involutus*, *Lactarius seriffuus*, *Russula alutacea*, *R. emetica*, *R. nigricans*, *Polyporus perennis*, *P. abietinus*, and *Boletus edulis*. None of the other plants seen were rare, the least common moss being *Plagiothecium undulatum*. Mr. Matthew Foster, of Sancton, reported for Geological Section, as follows:—Starting from Market Weighton on Sancton-road, the first appearance of the oolite was found at Gofer Hill—a very thin bed, not more than two feet, including its accompanying sandbed, overlying which the red chalk was very conspicuous in the high road. At Sancton, one mile further, the sandbed appears as a stratified rock 36ft. in thickness; this bed lies in a fault, dipping to the south at an angle of about ten degrees. The red chalk is seen on the top. Some large blocks of oolite which had been taken from below the sandbed, were lying near; outwardly they presented the usual appearance of the common oolite, but, when broken, the centre is found to be a very hard compact blue stone,

containing small specimens of coral. Proceeding to Newbald, two miles further, the sandbed is again seen about 20ft in thickness, unstratified, of a brown or reddish colour. This bed rests on the oolite, and is capped by a thin bed of the Kelloway, which, however, was scarcely visible, on account of a mass of brambles and weeds growing on the margin of the pit. About six feet from the top, running horizontally along the western side of the pit, is an ammonite bed about 6in. wide, full of holes like a honeycomb. Some attempts were made to obtain specimens, but they lie too far in the rock, which, when dry, is very hard. The floor of this bed was formerly an oolite quarry, from which the large circular stones (eddystones) were obtained. Some were used for bridges across the brook; one was deposited in the centre of the village green. This latter was visited, and found to be almost a perfect circle about $4\frac{1}{2}$ ft. in diameter, and about 14in. in thickness, the base being left in the pit, which is now filled up with rubbish. At South Cave, three miles further, the sandbed appears again, about 10ft. in thickness, dark-brown colour, coarse and gritty; this also rests on the oolite, capped by a mixture of small stones, sand, &c., embedded in Kimmeridge clay, the red chalk being about 100 yds. distant eastwards. This bed is full of fossils—*Terebratula*, *Modiola* numerous, *Am. communis* present but rare. Time not allowing for a visit to St. Austin's Stone, the route was directed to Hotham. Passing over the escarpment of the oolite, the middle lias beds are found in a road cutting near the village, from which specimens were taken. Passing over the escarpment of the lower lias, and skirting the hills, we arrive at North Cliffe; but time being short, we just glance at the cutting through the hill, and leaving it on the right, and Bulsbeck with its mammalian remains on the left, Weighton is reached just in time for the meeting. Mr. Foster, conductor of the geological party, exhibited fossils from the chalk, sandbeds, oolite, middle and lower lias, and the tertiaries at Bulsbeck. In Vertebrate Zoology Mr. T. Bunker reported having noticed, between Brough and Market Weighton the following:—Kestrel (2), common gull, coot, waterhen, lapwing, (now in flocks) greenfinch, yellow hammer, spotted flycatcher, willow wren, whitethroat, sand martin, &c. Mr. Roebuck stated, on behalf of Mr. Butterell, secretary of the Conchological Section, that the day had been too fine for land shells, and that several freshwater species had been found, none of them of very special interest, except a curious form of *Limnæa peregra* from the fish ponds of Londesborough. Mr. William Prest, of York, reported for the Entomological Section that very little of any note had been observed. *Peronea sponsana* occurred rather freely amongst beeches, and other species noticed included larvæ of *Cossus ligniperda*, *Notodonta camelina*, &c. A locust taken at Goole the previous day was exhibited. The meeting closed with an announcement from the chair that notices of motion for the annual meeting in January, 1881, should be sent to the secretaries in time to print in the circular convening the meeting.—WM. DENISON ROEBUCK.

Diary.—Meetings of Societies.

- October 2. Huddersfield Naturalists' Society, 8 p.m.
 „ 5. Leeds Naturalists' Club, &c.
 „ „ Liversedge Naturalists' Society.
 „ „ Bishop Auckland Naturalists' Society.
 „ 6. Wakefield Naturalists' Society.
 „ 8. Huddersfield Scientific Club, 8 p.m.
 „ 12. Leeds Naturalist's Club, &c.—Botanical and Microscopical Sections.
 „ 13. York and District Naturalists' Field Club.
 „ 14. Dewsbury Naturalists' Society.
 „ 18. Huddersfield Naturalists' Society.
 „ „ Manchester Cyptogamic Society, 7-30 p.m.
 „ 19. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
 „ „ North Staffordshire Naturalists' Field Club.—Excursion to Chester. Leader, Mr. Lynam.
 „ 25. Lancashire and Cheshire Entomological Society.
 „ 26. Leeds Naturalists' Club, &c.—Lecture on “The Fossil Flora of the Halifax Hard Bed,” by William Cash, F.G.S., of Halifax.
 „ 30. Huddersfield Naturalists' Society.

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No. LXIV.

NOVEMBER, 1880.

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Original Articles.

THE FLORA OF CARNARVONSHIRE AND ANGLESEA.

(Concluded.)

BY J. E. GRIFFITH, F.L.S., F.R.A.S.

CYPERACEÆ—continued.

- Eriophorum vaginatum*, L. Frequent in both counties.
E. angustifolium, L. Common in both counties.
E. gracile, Koch. (C) Cwm Idwal.
Carex dioica, L. (A) Cors ddygai, &c.
C. pulicaris, L. Frequent in both counties.
C. leporina, L. Frequent in Anglesea.
C. stellulata, Gooden. (C) Cwm Idwal, &c.
C. remota, L. Not uncommon in both counties.
C. paniculata, L. (A) Cors ddygai, &c.
C. vulpina, L. (A) Rhoscolyn, &c.; (C) near Capel Ogwen, Penrhyn Park, Bangor, &c.
C. divulsa, Good. (C) Near Cwm Glo, Llanberis, &c.
C. muricata, L. (A) Garn Llanfairynghornwy, &c.
C. arenaria, L. (A) Towyn, Aberffraw, &c.
C. cæspitosa, L. Frequent in both counties.
C. stricta, Good. (A) Cors hendre, near Pentraeth, &c.; (C) Near Cwm Glo, &c.
C. rigida, Good. (C) Ysgolion duon.
C. acuta, L. (A) Cors ddygai, near Hirdrefaig.
C. atrata, L. (C) Pass of Llanberis.
C. præcox, Jacq. Frequent in both counties.
C. pilulifera, L. Do. do.
C. filiformis, L. (A) Cors ddygai, &c.
C. hirta, L. Not uncommon in both counties.
C. extensa, Good. (A) Near Rhoscolyn, &c.
C. flava, L. Not uncommon in both counties.
C. Ederi, (A) Near Bodgylchad lake, Beaumaris.
C. distans. Frequent in both counties.
C. lævigata, Sm. In a dingle south of Ty Fry, near Pentraeth.
C. panicea, L. Frequent in both counties.
C. glauca, Scop. Do. do.
C. sylvatica, Huds. (A) Mill dingle, Beaumaris.
C. pendula, Huds. (C) Britannia Park.
C. vesicaria, L. (A) Cors ddygai, &c.; (C) Cwm Idwal, &c.

- C. riparia*, Curtis. (A) Cors ddygai, &c.
C. paludosa, Good. (A) Do. do.
C. fulva, Good. Frequent in both counties.
C. binervis, Sw. Do. do.
C. ampullacea, Good. Do. do.

GRAMINEÆ.

- Milium effusum*, L. Common in both counties.
Anthoxanthum odoratum, L. Abundant in both counties.
Phalaris arundinacea, L. Frequent on river banks and marshes in both counties.
Phleum pratense, L. Common in both counties.
P. arenarium, L. Not uncommon on maritime sands in both counties.
Alopecurus pratensis, L. Abundant in both counties.
A. geniculatus, L. Do. do.
Chamagrostis minima, Borkh. (A) Abundant south-west side of Coron Lake; beginning of April is best time for it.
Agrostis alba, L. Common in both counties.
A. canina, L. Do. do.
A. vulgaris, With. Do. do.
A. stolonifera. (A) Near Porth dafarch, Holyhead, &c.
Psamma arenaria, Beauv. Abundant in both counties, especially Anglesea.
Calamagrostis Epigeios, Roth. (A) Llemiog Castle, &c.
Phragmites communis, L. Common in both counties.
Aira cæspitosa, L. Do. do.
A. flexuosa, L. Do. do.
A. præcox, L. Do. do.
Avena caryophyllea, L. Frequent in both counties.
A. fatua, L. Do. do.
A. pratensis, L. (A) Arthur's Round Table.
Arrhenatherum avenaceum, Beauv. Common in both counties.
Holcus lanatus, L. Abundant in both counties.
H. mollis, L. Common in do.
Lepturus incurvatus, Trin. (A) Between Trecastell and Penmon, and near Porth dafarch, Holyhead, &c.; (C) under Gorddinog, Llanfairfechan, &c.
Nardus striata, L. Frequent in both counties.
Hordeum maritimum, With. (C) Great Ormshead.
H. murinum, L. Not uncommon in both counties.
Triticum repens, L. Abundant in both counties.
T. junceum. (A) Friars, near Beaumaris; Towyn Capel, near Holyhead, &c.

- Lolium perenne*, L. Abundant in both counties.
I. temulentum, L. Frequent in do.
Bromus asper, L. Do. do.
B. sterilis, L. Do. do.
B. mollis, L. Do. do.
B. giganteus, L. Do. do.
Festuca ovina, L. Abundant in both counties.
F. ovina, var. *vivipara*. Frequent in both counties.
F. rubra, L. (C) Borders Idwal Lake.
F. rubra, var. *duriuscula*. Frequent in both counties.
F. pratensis, Huds. Common in both counties.
F. Myurus, L. Frequent in both counties.
Dactylis glomerata, L. Abundant in both counties.
Cynosurus cristatus, L. Do. do.
Briza media, L. Do. do.
Poa fluitans, Scop. Do. do.
P. maritima, Huds. Frequent in both counties.
P. rigida, L. (A) Near Penmon, &c.; (C) on the roadside near Aber Church, &c.
P. loliacea, Huds. (A) On the beach under Tre Castell, Beaumaris, &c.; (C) Port Penrhyn, &c.
P. annua, L. Abundant in both counties.
P. compressa, L. Not uncommon in both counties.
P. pratensis, L. Abundant in both counties.
P. trivialis, L. Do. do.
P. glauca, Sm. (C) Cwm Idwal, &c.
P. alpina, L. (C) Cwm Idwal, Snowdon, &c.
Catabrosa aquatica, Beauv. Not uncommon in both counties.
Molinia cærulea, Moench. Frequent in both counties.
Melica uniflora, L. (C) Siliwen woods, Bangor, &c.
Kæleria cristata. (A) Porth Pestill, near Holyhead, &c.

LYCOPODIACEÆ.

- Isoetes lacustris*, L. (C) Abundant in Ogwen and Idwal Lake, &c.
I. echinospora. (C) Llanberis Lakes and Cwm Glo.
Pilularia globulifera, L. (A) Coron and Llanfaelog Lakes, &c.; (C) Idwal and Ogwen Lake, &c.
Lycopodium clavatum, L. Common on the Snowdonian range.
L. annotinum, L. (C) Between Twll du and Llanberis.
L. alpinum, L. Common in Cwm Idwal, &c.
L. selago, L. (C) Common on Snowdon range.
L. selaginoides, L. Do. do.

EQUISETACEÆ.

- Equisetum Telmateia*, Ehrh. Common in both counties.
E. arvense, L. Abundant in both counties.
E. limosum, L. Common in both counties.
E. palustre, L. Do. do.

FILICES.

- Ophioglossum vulgatum*, L. (C) Abundant in Penrhyn Park, Bangor, also near Fredd carw, Bangor.
Botrychium Lunaria, Sw. (C) Moelci, near Bangor, &c.
Osmunda regalis, L. (A) Near the Reservoir, Holyhead mountain, &c.
Polypodium vulgare. Abundant in both counties.
P. Phegopteris. (C) Common on the Snowdonian range.
P. Dryopteris. Do. do.
Allosurus crispus, Bernh. Abundant in both counties.
Aspidium Lonchitis, Sw. (C) Along the Snowdonian range, rare.
A. aculeatum, L. Frequent in both counties.
Nephrodium Thelypteris, Sw. On the margin at the south side of Llwydiart Lake, Anglesea, plentifully.
N. Oreopteris, Sw. Frequent on the Snowdonian range.
N. Filix-mas. Abundant in both counties.
N. cristatum. (C) Not uncommon.
N. spinulosum, Desv. Common in both counties.
N. dilatatum, Desv. Do. do.
Athyrium Filix-fœmina, Bernh. do.
Asplenium marinum, L. (A) Between Towyn Capel and South Stack, Holyhead, plentifully; also Puffin Island, &c. (C) Great Ormshead, &c.
A. Trichomanes, L. Abundant in both counties.
A. viride. (C) Frequent in Cwm Idwal and Twll du, &c.
A. adiantum-nigrum, L. Abundant in both counties.
A. Ruta-muraria, L. Do. do.
A. septentrionale, Hoffm. (C) Near Llanrwst, rare.
Scolopendrium vulgare, Sm. Common in both counties.
Ceterach officinarum, Willd. (C) On walls at Vaynol, also Coedmor, Bangor, &c.
Blechnum spicant, Roth. Common in both counties.
Pteris aquilina, L. Do. do.
Cystopteris fragilis, Bernh. Common on the Snowdonian range.
Hymenophyllum tunbridgense, L. (C) Twll du, &c.
H. Wilsoni. (C) Nant Francon, Cwm Idwal, &c., plentifully.

BRYOLOGICAL NOTES.

By W. WEST.

MR. HOBKIRK says, in the last number of the *Naturalist*, that Boulay states in the "Revue Bryologique" that Wilson made an error in his description of the peristome of *Orthodontium gracile*. Before bryologists accept that Wilson made such a mistake, his specimens ought to be examined; so ought those of Schimper and Müller, as they are said to fall into the same error. I have carefully examined a few mature capsules, and I find that the inner processes are shorter than the outer peristome, but irregular, mostly about half the length, a few attaining nearly the same length. The capsules examined were from tufts gathered on the 3rd of May, 1879; they appeared to have just shed their lids, all the other capsules (about 93 per cent.) still having them on, their beaks being oblique in dried specimens. I also examined capsules collected in March, 1878, but these appeared to be the fruits of 1877, as the peristome had almost vanished.

The above specimens were sent to me by Mr. E. M. Holmes, who had collected them at West Hoathly, Sussex, and Tunbridge Wells respectively, therefore this note records (if Mr. Holmes has not recorded them before) two new localities for a very rare moss, and Mr. Hobkirk's foot-note as to localities requires alteration. As I had very little material to work upon, I hope some one having a plentiful supply will also examine a number of specimens, and report the result. Mr. Hobkirk interestingly remarks that Wilson's description and figure disagree, and that he also finds Cheshire specimens sustain Boulay's remarks: my present opinion is, that the inner processes vary in length in different examples, and are somewhat irregular even in the same specimens. My examples seem to indicate a different time for mature fruit than March, which is given by Schimper and Mr. Hobkirk.

Mr. Lees states, in a former number, the localities known for *Eurhynchium striatulum*. To these I can add Wormhill, Derbyshire, where I gathered it in May, and Plymouth, where Mr. Holmes got it years ago. I also have specimens gathered at Cleveland, Bristol. Whether this locality be in Somersetshire or Gloucestershire I know not; but if in the latter, it makes another locality. I have specimens from Muggendorf, Oberfranken (Arnold) and from near Baden (Juratzka).

In the report of a meeting of the Manchester Cryptogamic Society in the *Naturalist* for October, 1879, it is stated that *Ædipodium Griffithianum* is confined to Britain. Schimper gives the following Continental localities :—*Prope Ulvig in Osedalen provinc. Bergen Norvegiæ, in Alp. Setensfjeld provinc. Romsdalen, in Jotunfjeldena ad Sogve, in Laxfjälla Lapponiæ umensis.*

Timmia megapolitana is reported as occurring on Ben Lawers in Mr. Hobkirk's Synopsis; it also finds a place in the London Catalogue of British Mosses. Does this species occur in Britain? I gathered a *Timmia* on Ben Lawers last August, which I find named *T. norvegica*; but on referring to the catalogue and to Mr. Hobkirk's Synopsis, I thought that my plant must be *T. megapolitana*, as that species was recorded as British, and there was no mention of *T. norvegica*. I therefore sent some to the Rev. J. Fergusson, and others, as *T. megapolitana*. Mr. Fergusson at once replied that my plants were *T. norvegica*, and that *T. megapolitana* was not known to occur on Ben Lawers. Schimper also states that the Ben Lawers plant is *T. norvegica*, and happily summarises the differences between the species.

I also brought specimens of *Hypnum ochraceum* from an altitude of 3000 feet on Ben Nevis, sixteen inches in length, and I have no doubt that I could find longer specimens if I had picked them. Schimper says, "*semipedales nempe, reperiuntur.*" I collected the var. *flaccidum*, Milde, at Marsden last January, ten inches in length.

At an altitude of over 3000 feet on Ben Lawers I found a yellow-green form of *Hypnum sarmentosum*, which puzzled me very much. Mr. Fergusson says it is often found within the Arctic Circle, being far from common in this country.

The leaves of *Grimmia torquata* are described by Schimper as "margine recto"; I find them to have the margins somewhat recurved. Berkeley says "slightly reflexed."

Brachythecium albicans generally has the margin of the leaves recurved. This is not mentioned in any of the books I have seen.

Hypnum virescens, Boulay, is said by M. Renauld to prefer clear cold streams containing in solution carbonate of lime; this is precisely the habitat in which I found this plant at Malham last year, but M. Renauld gives several Continental localities, with their altitudes, the lowest of which is at "le pied de Gabizos" at 1200 metres. The Malham altitude is only 230 metres.

HOW TO EXAMINE A MOSS.

BY C. P. HOBKIRK, F.L.S.

It has been suggested that if a few papers on elementary science, practically treated, were to appear occasionally in the *Naturalist*, they would materially increase its interest in the minds of many of its subscribers, and would also probably help many of the younger students in their labours. The matter has been talked over amongst some of our friends, and several promises of assistance in this way have been given. It is in the hope of stimulating those gentlemen who have so promised to begin their labours, by setting them the example, that I have been led to publish the following notes, and I trust they will shortly be followed by several others on different branches of Natural History.

Before examining our moss, it will be necessary—like the cook with the hare—first to get our moss. It is not my intention to write anything more on this point, as Dr. Parsons, F.G.S., has already given full directions for the purpose in his excellent paper on “Flowerless Plants and their Habitats,” in vol. iv. pp. 23 and 49.

Having, then, visited some suitable locality—say an old damp wall—in early spring, and gathered there a very showy and pretty looking moss, we must now proceed to find out what it is—what is its name. I would here observe, that the simple naming of any object in Natural History is not to be the *ultima thule* of our ambition ; at the same time it is undoubtedly necessary, before we can go any further with advantage in our researches, that we should know the name of the object under examination ; and then we can go further, and learn something of its relations to other species of the same genus, and to other genera and families ; its comparative structure and functions, and its geographical distribution, &c. In the study of mosses nearly all these points, however, have to be considered, to a greater or less extent, together, before we can arrive at the name ; and having once got the name, we already know a good deal of its intimate structure.

It is necessary that we should have some tools, and particularly a microscope of some kind. As a hint to beginners I would say, avoid all cheap (?) showy-looking instruments ; they are a delusion and a snare. I may add, without wishing to be invidious, that one of the best instruments I have seen for our purpose is made by Mr. Charles Collins, of 137, Great Portland Street, London. This is called the “Histological Microscope,” and its great advantages are that the tube is made of the full diameter, so that the eye-pieces of all the best makers will fit into it ; and it is also made with registration screw for

the objectives, and thus the objectives of all the chief makers may be used with it. Its price also is another recommendation. It can be purchased, with all necessary parts for the examination of mosses, for £5 10s., or with polariscope and other additions, for £7 10s. A few glass slides and thin covers, a few needles stuck into wooden handles (an old soft-wood penholder will do) with the points downwards and projecting about a quarter or half an inch, with the wood neatly cut down at the point like a pencil—and you are fully equipped.

Now sit down, having arranged your microscope and light, and get out a single plant of the moss, with a capsule (fruit) on it. The first point you have to ascertain is, does the fruit spring directly from the summit of the moss, or does it spring from the side of the stem? In the first case it belongs to the *Acrocarpi* (from two Greek words, *akros* at the top, and *karpos* a fruit)—or it may be pleurocarpous, that is, side-fruited (from *pleuron* a rib, or the side, and *karpos*.) There is also another style of fruiting, in which the capsule is terminal on a short branch springing from the side of the stem. Supposing, then, you have Wilson's "Bryologia," or any work based upon his classification, your next point to ascertain will be—assuming that your moss is acrocarpous—whether there be upon it a removable lid. Taking it that your moss has such a lid, we will for the present pass by those three genera which are not so provided, to be considered on some future occasion. Having removed the lid with the point of one of the needles, you must now examine the mouth of the capsule left open by its removal to ascertain whether there is a fringe of teeth surrounding it and springing from it, or not. Passing by those that are without teeth (*gymnostomi*—*gumnos* naked, *stoma* a mouth), we find your moss has a mouth surrounded by a number of small teeth (peristome—*peri* around, and *stoma*), in one row only, *i.e.*, peristome single. You must now try to find a capsule which bears what is called a calyptra (*kaluptra* a covering or veil). This is a thin membranous veil at first covering the whole of the capsule, but as the stem grows it splits off, and a portion of it is carried upwards on the summit of the unripe capsule. Should you find one, notice whether it be formed like the extinguisher of a candle, open at the bottom only—*i.e.* mitriform—or slit up on one side, *i.e.* dimidiate. Finding it to be dimidiate, you must now slit the capsule from base to summit on one side with a sharp knife, spread it out on a slide with a little water, put on a thin covering glass, and place it on the stage of the microscope under a 1-inch objective, and proceed to count and examine the teeth of the peristome, and their relative positions and conditions.

(To be continued.)

Short Notes and Queries.

ORNITHOLOGICAL NOTES.

MIGRATION OF BIRDS.—This season, nearly all our summer birds have left us a month sooner than usual. All the warblers, swallows, and martins departed by the middle of September, with a few exceptions. I saw a few martins flying over the canal Oct. 9th. Mr. Parkin, of Brampton, Cumberland, informs me that he saw a flock of redwings Sept. 25th; and Mr. John Cordeaux, of Lincolnshire, writes to Mr. Clarke that almost all the winter visitors are nearly a month sooner this year. This is a sure indication of a severe winter.—JAS. VARLEY, Huddersfield.

CURLEW NEAR HUDDERSFIELD.—On Aug. 23, I had a curlew (*Numenius arquata*) brought in, shot at Pilberry reservoir, near Holmfirth.—J. V.

HERON NEAR HUDDERSFIELD.—I had a fine heron (*Ardea cinerea*) brought in Sept. 4th, also shot at Bilberry reservoir.—J. V.

LATE NESTING OF THE GREENFINCH.—On Oct. 4th, I found a nest of the greenfinch, containing five fledged young ones, at Almondbury Bank.—J. V.

A BIRD'S NEST IN THE HEART OF A TREE.—On the 5th of the present month, while the sawyers at the Farnley Ironworks, near Leeds, were engaged cutting up a Dutch elm from the Castle Howard estate, they were surprised to find in a cavity in the heart of the trunk a bird's nest containing eggs, the exact number of which is not quite certain, as some were broken in the process of sawing, but six of them were obtained quite uninjured, and the broken remains are estimated to represent from four to six more. The cavity was situate 21 ft. from the root end of the trunk (which at this point was 16 inches in diameter), and measured 24 inches in depth by 3 inches across. The nest occupied the bottom of the cavity, and consisted of a quantity of moss in a very decayed state. The eggs are described as being of a dirty white ground colour and spotted somewhat faintly with dark brown, inclining to red; but so many years have elapsed since they were deserted, that the contents have entirely evaporated, leaving not the faintest trace of a former presence. I am inclined to think, from the number and description of the eggs, and the situation of the nest, that they are most probably those of a blue tit-mouse. The thickness of the solid timber wall, which entirely closed the cavity from the outer world, was five inches at the lower extremity and three-and-a-half at the upper extremity, the latter being the minimum thickness. The number of "rings of growth" between the cavity and the bark, counted at the thinnest part, was sixty. This would indicate that the cavity had been sealed for at least that number of years, although the nest and eggs must be considerably older; for there must be added the number of years that necessarily intervened between the abandonment of the nest and the final closing of the aperture, before the formation of complete rings of growth could have commenced.—WM. EAGLE CLARKE, Leeds.

GREAT-CRESTED GREBE NEAR LEEDS.—On the 18th September my brother and I observed a pair of great-crested grebes on Waterloo Lake, at Roundhay Park. We watched them for about an hour, and with the aid of a field-glass were able to see them very distinctly. These birds are very scarce in this neighbourhood. We also saw at the same time a brood of young waterhens, apparently not above a week old; this is rather late to meet with young waterhens. Last winter I saw a pair of little grebes, at Roundhay. This is also a rare bird, not a single previous instance of its breeding in this locality having come under my observation.—WALTER RAINE, Leeds, Oct. 18th.

ENTOMOLOGICAL NOTES.

EAST-RIDING LEPIDOPTERA.—I have just been reading the Transactions of the Nat. Union, lately issued. In the remarks upon the macro-lepidoptera for 1878 I see allusion made to *Anchocelis lunosa*, as a Yorkshire rarity. If this applies merely to that year, it is undoubtedly true, but otherwise the insect is by no means uncommon on the fen land here. I take it on the flowering reeds, and sitting on gas lamps, and in ordinary years usually bring home several in an evening's walk, when out for *lutosa* (Reed flowers, it might not perhaps be generally known to your readers, are as attractive as sugar.) For the past two years, however, I have missed *lunosa*, nor have I seen it this autumn.—A Yorkshire rarity, I believe, is *Mamestra abjecta*, of which I took eleven at the mouth of the Humber in August, this year, and to my certain knowledge missed three more. From the locality I judge they may be always found there. On the same occasion I took the finest series of *Agrotis cursoria* I have ever seen. Both these and *Ripæ* are much darker in Yorkshire than are southern specimens.—N. F. DOBREE, Beverley, Sept. 27th.

Aplecta occulta AT HULL.—To Mr. Prest's record of the capture of *Aplecta occulta* at York, I can add the take of thirteen in this immediate vicinity during last August. They have never been seen here before.—N. F. DOBREE, Sept. 27th.

Vanessa Antiopa NEAR BRADFORD.—A non-entomological friend recently described to me an insect as "a large dark moth with a white edge," which he had seen flying and resting on geraniums, &c., in an ornamental flower garden at Manningham. I took out a drawer from my cabinet, and asked him to show me the insect he had seen, when he unhesitatingly pointed to *Antiopa*. It had been noticed for several days. The following Sunday (Sept. 26th) I had the pleasure of seeing one fly over my head and into some villa gardens near the same place (Lister Park); at least from its size and general appearance I feel sure it could be no other butterfly.—J. W. CARTER, Manningham, Bradford, Oct. 4th.

Aplecta occulta NEAR BRADFORD.—ShIPLEY Glen is another locality added to the range of *A. occulta* in Yorkshire, in 1880, a beautiful fresh specimen being taken there by Messrs. Wardman and Dawson on the 28th of August, which is the first observed in this district.—J. W. C.

LOCUSTS IN YORKSHIRE.—Second appearance in 1880.—After the appearance of the flight of locusts recorded in last month's *Naturalist*, the weather, which had so favored their appearance, changed to cold, and of course checked their wanderings. In the third week of September, however, it became again fine and very warm, and the locusts again appeared. Mr. Henry Pollard secured one which had been taken in a field in Pontefract-lane, Leeds, on the 27th Sept., and about the same time one was taken near Wortley, at the other extremity of Leeds borough. I have also heard vague rumours of others, but nothing definite.—WM. DENISON ROEBUCK, Leeds, Oct. 18th.

SMALL *Sirex gigas*.—I have just had sent me by my friend Mr. Barraclough, chemist, Chapeltown-road, Leeds, the smallest specimen by far of *Sirex gigas* which I have ever seen. It is a female, and only measures one inch (exactly) in length from the head to the end of the ovipositor.—W. D. R., Oct. 19th.

Chara stelligera, BAUER, IN GREAT BRITAIN.—This species was gathered by myself in Filby Broad, near Great Yarmouth, Norfolk, on Sept. 23rd. It was growing in from four to eight feet of water, with *Potamogeton crispus*, *Myriophyllum spicatum*, and other water plants. It is the *C. obtusa* of Desvaux, and is distinguished especially by its pretty four- to eight-rayed star-like bulbils, through which the rhizomes pass.—

ARTHUR BENNETT.—[Mr. Bennett writes us that he is very desirous of learning the distribution of Characeæ in Great Britain "beyond the published records, and would at any time be pleased to name any specimens for anyone who is gathering them. There are some western European forms that will almost certainly occur with us, especially several Scandinavian species, so that all may have a chance of finding something new and original." We recommend any of our friends who are studying these plants, to communicate with Mr. Bennett, whose address is 107, High-street, Croydon, Surrey.—*Eds. Nat.*]

CAUCASUS PLANTS.—Mr. V. F. Brotherus, of Helsingfors, already known to botanists through his voyage to Lapland in 1872, purposes to pass the summer of 1881 in the central Caucasus, to make collections of flowering plants. These will be issued to subscribers at the following rates :—

50 species for 15 francs (or 12 marks 30 pf.)	about 12/6.
100 " 25 " (or 20 marks 50 pf.)	" 21/-
150 " 40 " (or 32 marks 80 pf.)	" 33/6

not post paid. The collections will include many oriental species. Subscriptions will be received by A. Geheeb, Geisa, Saxony-Weimar, Germany.

LOCAL PLANT RECORDS.—Mr. Jas. Britten, F.L.S., writes us to the effect that he purposes publishing in the "Journal of Botany," in the

ensuing year, a British Botanical Bibliography, to include a reference to all that has been published during 1880 upon British plants. He would be grateful to any private individuals or local societies for any publications they may have or publish, giving a record of what is being done in local botany by them. Communications should be addressed to Mr. James Britten, F.L.S., Editor of Journal of Botany, Natural History Museum, South Kensington, London, S. W.

ADDITIONS TO THE WEST RIDING FLORA.—*Dicranella heteromalla*, var. *elata*, Ferg., a very tall form, Marsden Moor. *Limnobium ochraceum*, var. *flaccidum*, Milde, a long distinct form in a rill near Marsden. *Hypnum cupressiforme*, var. *lacunosum*, a fine robust form occurring on limestone walls in sub-alpine districts. *Trichostomum crispulum*, var. *elatum*, Gordale. *Madotheca porella*, gathered from a rock in Collingham Bank Wood. *Chantransia violacea*, Ktg., growing on *Lemanea fucina*, Borg., on rocks in the stream which pours down Gaping Ghyll, Inglebro', both species being new. *Gloeotila mucosa*, Ktg., in a pool on Malzeard Moor. *Conferva Funkii*, Ktg., and *Ulothrix tenuis*, Ktg., at Frizinghall Dam. *Fragilaria mutabilis*, Sm., very abundant in a well at Marsden. *Gomphonema constrictum*, Ehrh., near Wooley. *Gloeocystis vesiculosa*, Naeg., Rawcliffe Common. *Asterionella formosa*, Hass., near Wetherby (or Bradford). There is an uncertainty as to the exact habitat of the last-mentioned plant. About two months ago I gathered some very fine fruit of *Campylopus turfaceus*, near Wetherby; the ripe spores were shed in such abundance in drying, that I placed some on slides, and carefully laid covers on them, placing them in a large evaporating dish with Bradford tap-water, covering the dish with sheet glass. This was done to grow the protonema of the moss. When I looked for protonema I found an abundant crop of fine examples of *Asterionella formosa* on the slips and covers, and I am unable to pronounce whether it originated from the Bradford tap-water or the Wetherby spores and dust, though I lean to the latter, because the *Asterionella* grew all over the bottom of the dish, the slips, and covers quite away from the sown spores as well as near them. I have now sown the bottom of the evaporating dish with small glass circles, in anticipation of a fine harvest.—WM. WEST, Bradford.

Coremia munitata.—CORRECTION.—The insect which I took at Wharcliffe was, as Mr Harrison suggests (*Naturalist* vi., p. 42.), *C. propugnata*, and it was under that name that I exhibited it to the Leeds Naturalists' Club. The mistake was made by the member who wrote down the name of my insect from my dictation for the secretary's use, and he either misunderstood me, or else wrote *munitata* for *propugnata* inadvertently. At all events, I showed the insect under its right name. Our secretary is not to blame either, for he copied the list as supplied to him.—CHARLES SMETHURST, 25, Chatham-street, Leeds, Oct. 26th.

Rainfall for September.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4·38	16	25·31	* 23·61	12	0·90
HALIFAX... (F. G. S. Rawson)	360	4·60	16	30·27	34·50	...	...
BARNSEY ... (T. Lister) ...	350	4·83	16	26·60	26·13	14 & 15	0·78
INGBIRCHWORTH (do.)	853	5·27	15	32·27	30·47	12	1·03
WENTWORTH CASTLE (do.)...	520	4·65	13	25·74	25·96	15	0·79
GOOLE ... (J. HARRISON) ...	25	4·40	11	22·91	20·00	15	1·31

* This is the average to date for 14 years, 1866-79.

Reports of Societies.

BARNSEY NATURALISTS' SOCIETY.—At the meeting Oct. 12th (Mr. T. Lister in the chair), several communications, verbal and by letter, were made, chiefly on birds. The following observations of birds have been made :—Sept. 6, three or four kestrels hovering over New Lodge and fields ; 18th. seventeen wild geese flew over Barnsley to Worsborough, and a landrail was also seen ; 19th, starlings heard first time this autumn ; immense flocks, old and young mingled, seen in their favourite haunts. 24th, curlews passing overhead by night : 26th, as many as twenty-one magpies seen by Mr. W. Barrowclough (secretary), over Stainborough woods, also a kestrel. 26th, first hooded crow reported by Mr. E. Hailstone, Walton Hall ; a brace of woodcocks obtained by Mr. H. Garland, Woodhall. 28th, landrail noted. Oct. 2, redwings in flocks ; bramblings seen at Nostell ; grey wagtail reported by Mr. W. Talbot—the last two winter visitors from west and north Yorkshire. The fieldfare is the only migrant from Norway yet unreported. On the 10th, upwards of 100 long-tailed titmice reported by Mr. R. Creighton between Kirby and Hemsworth ; also gulls (*L. tridactylus*) on the 16th. 18th, five wild ducks, a heron, coots and moorhens observed by Mr. Lister at Walton Hall lake. A locust (one of the two captured at Cockerham, near the town), and a weevil (one of the boring beetles), were exhibited, and papers read from the British Association Meeting by the president, who took part. Mr. G. Rose reported two long-eared bats (*Plecotus auritus*), brought out of the New Rocks mine, and one of the same kind was seen at Rockley.—T. LISTER.

HUDDERSFIELD SCIENTIFIC CLUB.—October meeting, Mr. S. L. Mosley, president, in the chair.—Mr. C. P. Hobkirk showed *Campylopus introflexus*, recently gathered by himself in Jersey ; also a long series of mosses

gathered by Mr. T. W. Naylor Beckett, F.L.S., in Ceylon, including *Neckera flabellata*, *Fissidens anomalus*, 5,700 ft. alt., *Leucobryum Bowringii*, 3,000 feet alt., *Dicranum edentulum*, *Stereodon cyperoides*, *Diphyscium involutum*, *Macromitrium fasciculare* on coffee trees, 4,000 feet alt., and *Trachypus crispatus*, 5,000 feet alt. Mr. G. T. Porritt showed a box containing the following lepidoptera he had recently received from Lord Walsingham :—*Coccyx Ochsenheimeriana*, discovered for the first time in Britain last year by Lord Walsingham, on his own estate at Merton ; *Eupacilia Degrayana*, a species also first discovered by his lordship some years ago, and named after himself ; *Coccyx distinctana*, *Pterophorus latus*, *P. pilosellæ*, and *P. isodactylus* ; Mr. Geo. Brook, the following crustaceæ :—*Galathea strigosa*, *Xantho florida*, *Porcellana platycheles*, *Axiis sterynchus*, *Inachus dorynchus*, *Pisa tetraodon*, *Scyllarus arctus*, *Portunus corrugatus*—all from the Channel Islands ; *Atelecylus heteredon*, from Aberdeen ; a monster prawn (*Palæmon vulgaris*), from Weymouth ; *Corystes cassivelaunus*, from Southend ; *Stenorynchus phalangium*, from Southend : and the same species from the mouth of the Thames in comparison. With a new and very excellent style of microscope—Collins' histological improved—Mr. Hobkirk showed double stained sections of rat's tail, *Tilia Europæa*, *Viburnum Lantana*, and triplet slide illustrating the exogens, endogens, and acrogens. The Official Report on the Salmon Disease, by Messrs. Frank Buckland, Walpole, and Young, was laid on the table.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—398th meeting, September 21st.—Mr. Washington Teasdale, F.R.M.S., vice-president, who occupied the chair, exhibited some tracings of new patterns of pendulum curves, and the "ornithophone"—a new French toy which, by friction, produces sounds extremely like the cries of birds and the squeaks of insects. Mr. J. W. Dixon showed microscopic drawings, Mr. F. Emsley, various slides of insects ; Mr. J. R. Murdoch, slides of cryptogamic plants prepared by the Rev. J. E. Vize ; Mr. W. Raine, fossils from Whitby, and *Planorbis corneus*, *P. complanatus*, *Limnæa stagnalis*, and *L. peregra*, all very fine and large, from Strensall Common ; Mr. H. Pollard, Collingham and Masham examples of *Bulimus obscurus* ; also an example of its rare variety *albus* from Whitby, as recorded previously in the *Naturalist* ; *Helix lapicida* from Ellington, near Masham ; *L. peregra*, var. *acuminata*, from the Serpentine in Hyde Park, London ; deformed examples of *L. peregra* from Normanby, N.Y., and dwarfed specimens from a reservoir in Bolckow and Vaughan's works at Southbank, N.Y.

399TH MEETING, Sept. 28th, Mr. Henry Lupton, vice-president, in the chair.—Mr. Walter Raine brought a great grey shrike's skin, also a dried long-eared bat from Ryther. Specimens of the sparrow-hawk from Sheriff Hutton, and of the ferret (dark variety), killed by a dog at Rothwell, were shown ; the latter had been sent as a polecat, which it was

not, and had it been, would have been an acquisition to the fauna of the district. The "grayling" butterfly (*Satyrus Semele*) from the Isle of Man, was also shown. Mr. H. Pollard showed a locust (see p. 59 of this number) and a quantity of shells of *Helix nemoralis*, *H. hortensis*, and *H. hybrida*, from Masham, Scarborough, Woodlesford, Stoke Bishop, and Whitby. Mr. John Grassham also showed shells—*Helix cantiana* and *Succinea putris* from Bishop's Wood; *Helix aspersa* and *H. arbustorum* from Knaresborough; *H. ericetorum* and *H. virgata* from Scarborough; *H. nemoralis* from Pontefract; *H. hortensis* from Topcliffe; *H. lapicida* from Wentbridge; *Planorbis corneus* from Leeds; *Clausilia laminata* from Grange; *C. rugosa* from Barwick; and *Zonites cellarius* from Gledhow. He also showed eggs of most of the British terns.

400TH MEETING, Oct. 5th, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. F. Emsley showed mounted hymenoptera; Mr. W. Barwell Turner, F.C.S., F.R.M.S., slides of stellate hairs, of leaf and cuticle of *Viburnum lantana*, and two micro-fungi—*Uncinula bicornis* from maple, and *Triphragmium ulmarie* from meadow-sweet—the latter of which is distinguished from other brands by being three-spored. Mr. W. L. Teasdale showed larvæ: Mr. Turner a Somersetshire *Acherontia Atropos*; and Mr. C. Smethurst a very dark variety of *Polia Chi* from Stanley, near Methley; *Hydræcia petasitis* from Thorne, Wakefield; *Eubolia cervinaria* from Linton Spring, Wetherby. Mr. Grassham reported another locust. Mr. Smethurst showed a lot of shells: *H. nemoralis*, *H. cantiana*, *H. hybrida*, *H. hortensis*, and *H. arbustorum* from Thorp Arch; *H. rufescens*, *H. hispida*, *Zonites nitidulus*, *Z. alliarius*, *Clausilia rugosa*, *Cochlicopa lubrica* and its variety *lubricoides* from Linton Spring; and *Sphærium corneum* from Bramham. The specimens of *Helix hortensis* were of the translucently banded variety. Mr. Wm. Nelson showed *Anodonta cygnea* and *A. anatina* from Burton-on-Trent, *Pisidium fontinale* var. *cinerea* from a pond at Hartington-in-Dovedale, and a very depressed *Helix arbustorum* from the same place. Mr. H. Pollard had *Limnæa stagnalis* and *L. palustris* from Masham, and *Helix arbustorum* var. *flavescens* from Scarborough. He showed various eggs, amongst them being two of the song-thrush from Ewe Cote, near Whitby, which are much smaller and more globular than the type. Mr. Thomas W. Bell showed fossils *Voluta Lamberti*, *Pectunculus*, *Cyprina Islandica*, *Natica multipunctata*, *Cypræa Europea*, *Pecten maximus*, and *Polyzoa*, from the Coralline Crag; *Fusus contrarius*, *Terebratula grandis*, barnacles, &c., from the Red Crag—with the view of showing the change of climate which took place between the deposition of the red and coralline crags.

401ST MEETING, Oct. 12th, chair occupied successively by Mr. Henry Pocklington, F.R.M.S., vice-president, and the president.—Microscopic exhibits were made by Messrs. F. Emsley and W. B. Turner, F.C.S. Mr. William Nelson showed *Helix rufescens* var. *minor* from Stanley, near Methley; this variety is not by any means common about Leeds. Mr.

H. Pollard brought *Tectura testudinalis* from Saltwick, near Whitby; *Donax politum*, *Helcion pellucida*, *Emarginula reticulata*, *Tellina tenuis*, *Trochus cinereus* and *Saxicava rugosa*, with a piece of lias pierced by the last—all from Saltburn-by-the-Sea. Marine shells of genera *Eburna*, *Conus*, *Natica*, and *Cerithium*, from Salsette Island, Bombay, also a cast snake-skin from India, were shown by Mr. W. L. Teasdale. *Ennomos erosaria* was shown by Mr. C. Smethurst. Mr. Walter Raine showed eggs of the cuckoo, which had been taken from nests of the meadow-pipit on Adel Moor; also weasels, old and young, from Ryther.—W. D. R.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, 20th Sept., Dr. Carrington in the chair.—Messrs. Cunliffe and Rogers exhibited a further series of mosses gathered during the month of July, upon the Breadalbane mountains. The specimens were mounted both for the herbarium and the microscopical cabinet, making altogether an interesting and instructive series. Mr. Cunliffe also exhibited freshly-gathered specimens of *Dichodontium pellucidum*, var. *fagimontanum*, from Handforth, Cheshire, and some slides of mosses from the “Arctic Peat Bog” at Oldham, recently discovered by Mr. Neild. The discussion upon the latter subject was deferred until the October meeting. Amongst other mosses exhibited were fine specimens of *Encalypta streptocarpa* (fruit) and *Myurella julacea*, by Mr. Cash, both gathered by him in the month of August—the former near Bolton Abbey, Yorkshire, and the latter along with *Encalypta ciliata* and other rarities on the summit of Ingleborough. The occurrence of *Physcomitrella patens* at Appleton, Cheshire, was reported by the same member, and specimens were exhibited. Mr. Entwistle read some interesting correspondence he had had in reference to the beautiful fern *Adiantum Farleyense*, which is so universally admired. The late Mr. Smith of Kew Gardens, had stated that it originated as a barren sporeling sport from *Adiantum tenerum* at Farley Hill Hall, in Barbadoes, but it had also been received, as a wild fern, in the autumn of last year from the Island of Montserrat, and specimens from there were deposited in the herbarium at Kew. Mr. Rogers called attention to the fact that a similar variation of form occurred in the British maiden-hair fern, found by Mr. Tyerman in Cornwall, and now known as *Adiantum Cornubiense*, which, like *A. Farleyense*, is seldom found fertile when true to varietal form.

OVENDEN NATURALISTS' SOCIETY.—The following mosses were obtained in the neighbourhood of Saddleworth by Mr. J. Spencer:—*Atrichum crispum*, *Dichodontium pellucidum* and *Disclium nudum*; also the following from our own district:—*Polytrichum commune*, *Hypnum commutatum*, *Dicranella cerviculata*, *Bryum atropurpureum* and *Sphagnum acutifolium*. Mr. T. Hirst exhibited a good number of British and foreign birds. The following geological specimens were shown by Mr. Spencer: *Sigillaria elegans*, *S. organum*, *Lepidodendron selaginoides*, *Dadoxylon* and *Oldhamia*.—J. OGDEN, Sec.

Diary.—Meetings of Societies.

- November 1. Huddersfield Literary and Scientific Society.—“The Air we breathe.” J. S. Cameron, M.D., B.Sc. 8 p.m.
- “ 2. Leeds Naturalists’ Club, &c.—Microscopical and Botanical Sections.
- “ “ Liversedge Naturalists’ Society.
- “ “ Bishop Auckland Naturalists’ Society.
- “ 3. Wakefield Naturalists’ Society.
- “ 9. Leeds Naturalists’ Club, &c.—Entomological and Vertebrate Sections.
- “ 10. York and District Naturalists’ Field Club.
- “ 11. Dewsbury Naturalists’ Society.
- “ 12. Huddersfield Scientific Club.
- “ 15. Manchester Cryptogamic Society.
- “ “ Huddersfield Naturalists’ Society.
- “ “ Huddersfield Literary and Scientific Society.—“The Narcotics we indulge in.” C. P. Hobkirk, F.L.S.
- “ 16. Leeds Naturalists’ Club, &c.—General Meeting.
- “ 18. North Staffordshire Naturalists’ Field Club.—Meeting at Hanley, Local Secretary, Mr. A. Smith.
- “ 23. Leeds Naturalists’ Club, &c.—Microscopical and Botanical Sections.
- “ 27. Huddersfield Naturalists’ Society.
- “ 29. Lancashire and Cheshire Entomological Society.
- “ 30. Leeds Naturalists’ Club, &c.—Entomological and Vertebrate Sections.

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No. LXV.

DECEMBER, 1880.

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Original Articles.

PRESENTATION OF THE MEMORIAL TO DR. DARWIN.

THE memorial of the Yorkshire Naturalists' Union was presented to Dr. Darwin at his residence, Down, Beckenham, Kent, on 3rd Nov., by a small deputation consisting of Dr. Sorby, F.R.S., of Sheffield, Vice-president of the Union; and Messrs. Geo. Brooke, *ter.*, F.L.S., of Huddersfield; W. Cash, F.G.S., of Halifax; J. W. Davis, F.L.S., F.G.S., of Halifax; and Thomas Hick, B.A., B.Sc., of Harrogate. Prof. Williamson, F.R.S., of the Queen's College, Manchester, the President of the Union, was prevented from accompanying the deputation by the pressure of his professional duties. The deputation arrived at Mr. Darwin's residence about 1 p.m., and was received in a most hearty manner by the great naturalist himself, Mrs. Darwin, and other members of the family, including Miss Darwin and Mr. Francis Darwin. Fortunately Mr. Darwin was in a much better state of health than he has enjoyed of late, and on that account the fears of the deputation that their visit might prove too fatiguing for him were happily not realised. The members of the deputation were introduced individually to Dr. Darwin by Dr. Sorby, and then the interesting ceremony of the presentation of the address was proceeded with.

Dr. SORBY stated that the Yorkshire Naturalists' Union, on whose behalf the deputation appeared, was a confederation of natural history societies which are located in various towns in the great county of York. It was originally formed in 1861, but was reorganised and renamed in 1877; and at present there are twenty-seven societies in the Union, with an aggregate of about 1,500 members. Among the objects of the Union are the investigation of the natural history of the county in all its branches; the combination and organisation of individual effort; and the cultivation and diffusion of a taste for natural history pursuits. The work of the Union is done by means of sections, each devoted to one department, after the plan of the British Association, and from time to time reports of what has been done are published in the form of Transactions.

The address was then read by Mr. THOMAS HICK, and formally presented to Dr. Darwin by Dr. Sorby, who expressed the great gratification he personally felt in doing so. Replying to the address,

Dr. DARWIN assured the deputation of his deep sense of the honour the Yorkshire Naturalists' Union had conferred upon him on that occasion, and only regretted that he had not done something more deserving of such an honour. He had no idea previously that there

was so strong a body of working naturalists in Yorkshire, but he was pleased to learn that such was the fact, and to find, from the Transactions that had been forwarded to him, that they were doing useful work. Coming from such a body, the address was all the more gratifying to him, though he still feared he hardly merited the good things that had been said of him. The address which had been presented to him, he and his family would for ever treasure and preserve, and he desired to express his warmest thanks, both to the deputation and those whom they represented, for it, and for the kind and considerate manner in which everything connected with it had been arranged.

Subsequently the deputation were entertained at luncheon, and having spent a short time in familiar conversation with their distinguished host and his family, took their departure amid mutual expressions of kindness and regard. The following is the text of the address, which is beautifully engrossed and illuminated by Mr. Chas. Goodall, of Leeds, and very handsomely bound :—

TO CHARLES DARWIN, LL.D., M.A., F.R.S., &c., &c.

Sir—The Council and Members of the Yorkshire Naturalists' Union, all of whom, with scarcely an exception, are working students in one or more of the various branches of natural history, desire to express to you in a most respectful manner, and yet with the greatest cordiality, their admiration of your life-long devotion to original scientific research, and their high appreciation of the almost unparalleled success of the investigations by which you have contributed largely to the modern development and progress of biological science.

More especially do they desire to congratulate you on the fact that your great work on "The Origin of Species" will come of age at an early date, and that your life has been spared long enough to enable you to see the leading principles therein enunciated accepted by most of the eminent naturalists of the day. On the conspicuous merits of that and your other published works they need not dwell, as those merits have been recognised and admitted even by those who have dissented most strongly from the conclusions at which you have arrived. They may, nevertheless, be permitted to remind you that your writings have been instrumental in giving an impetus to biological and palæontological inquiries, which has no precedent in the history of science, except perhaps in that which followed the promulgation of the gravitation theory by Newton, and that which was due to the discovery of the circulation of the blood by Harvey.

One of the most important results of your long-continued labours, and one for which you will be remembered with honour and reverence wherever and as long as the human intellect exerts itself in the pursuit

of natural knowledge, is the scientific basis you have given to the grand doctrine of evolution. Other naturalists, as you yourself have shown, had endeavoured to unravel the questions that had arisen respecting the origin, classification, and distribution of organic beings, and had even obtained faint glimpses of the transformation of specific forms. But it was left to you to show, almost to demonstration, that the variations which species of plants and animals exhibit, and in natural selection through the struggle for existence, we have causes at once natural, universal and effective, which of themselves are competent not only to explain the existence of the present races of living beings, but also to connect with them, and with one another, the long array of extinct forms with which the palæontologist has made us familiar.

Further, the Yorkshire naturalists are anxious to place on record their firm conviction that in the care, the patience, and the scrupulous conscientiousness with which all your researches have been conducted; in the ingenuity of the experiments you have devised: and in the repeated verifications to which your results have been submitted by your own hands, you have furnished an example of the true method of biological inquiry that succeeding generations will deem it an honour to follow, and that cannot but lead to still further conquests in the domain of organic nature.

In presenting this small tribute of their high regard and esteem, the members of the Yorkshire Naturalists' Union cannot but hope and pray that many years of happiness and usefulness may yet remain to you, and that our science and literature may be still further enriched with the results of your researches.

WILLIAM C. WILLIAMSON, F.R.S., President.

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THOMAS HICK, B.A., B.Sc., }

August, 1880.

Since the return of the deputation a letter has been received from Dr. Darwin by Mr. W. D. Roebuck, in which he writes:—"The address which was presented to me is certainly one of the greatest

honours ever paid to a scientific man. It is admirably expressed, and the engrossing seems to me an exquisite work of art. I fear that I by no means deserve all that is said of me in the address; but it shows the great kindness and sympathy of the senders. Pray accept my best thanks for all the kind interest which you have shewn in the affair, and believe me, dear sir, yours faithfully,
CHARLES DARWIN."

ORTHODONTIUM GRACILE.

BY J. CASH.

THE discrepancy between Wilson's figure and the description of the peristome of this moss in the "Bryologia Britannica," is certainly curious, and it were much to be desired that we had some means of explaining it. The species was unknown until, on the 25th March, 1833, Mr. Wilson discovered it at Helsby, Cheshire; and, as appears by his journal of that period, he devoted "nearly a whole day" (29th March) to making a drawing of it. It is therefore certain that, so far as this drawing is concerned, no inaccuracy can have crept in from any want of care or pains bestowed upon the subject. I happen to possess several tufts which were gathered by Mr. Wilson at the time named. The packet is labelled, in his own writing, as follows:—

"*Bryum gracile* (Wilson in Eng. Bot. Suppl. t. 2835.) *Orthodontium lineare*, Schwaeg. Near Warrington, March, 1833. On sandstone rocks. W. Wilson."

The condition of these specimens indicates that they must have been gathered when the fructification had reached maturity. Most of the lids are fallen; in some cases they still adhere to the perfect capsule; in a few, the lids, though adhering, are partially lifted; and in one, at least, there is a calyptra *in situ*. I sacrificed several capsules—one of which was just ripe, and full of spores—in order to elucidate the point which has been raised, namely, as to the comparative length of the internal processes of the peristome. These processes I found in most instances fragmentary, as may be imagined in specimens nearly half a century old, but in one or two of the capsules they were still perfect, and the result of my examination was to confirm the accuracy of the figure in Bry. Brit. The perfect cilia are unquestionably equal in length to the outer teeth of the peristome.

The figure in "English Botany Supplement," above referred to, is not identical with that which appears in Bry Brit.; but in this, the older, figure—just as in Bry. Brit.—the filiform processes are represented fully as long as the external teeth. I have no doubt that this English Botany figure is the one upon which Mr. Wilson bestowed so much pains on the 29th March, 1833. The italics in the following passage, from the description which accompanies the figure in English Botany, make the Bryologia Britannica description all the more inexplicable:—

"Outer peristome of sixteen pale yellow acuminate teeth, which in dry and mature specimens are strongly incurved so as to be concealed within the capsule. Inner peristome a membrane divided almost to the base into sixteen very narrow filiform erect processes, *as long as the outer peristome*, without intermediate cilia." There are appended to this description the well-known initials, "W. W."

Perhaps Mr. West will pardon me if I say that the Tunbridge locality is not new. The credit of that discovery belongs to the late Mr. Borrer. In a letter to Mr. Wilson, dated July 15th, 1844, referring to various mosses, he wrote:—" *Orthodontium gracile* I have found on sand-rocks near Tunbridge Wells."

Manchester, Nov. 2nd, 1880.

BUCKINGHAMSHIRE LICHENS.

BY WM. WEST.

MR. E. M. Holmes, F.L.S., who is well known as a devoted and assiduous cryptogamist, recently sent me a parcel of lichens which he had collected during a ramble in Buckinghamshire; the majority of them were already named by him. The following is a list of the species:—

Leptogium lacerum, Ach., a rare species	Evernia prunastri, L.
L. subtile, Schrad.	Ramalina evernioides, Nyl., a "reticulata-rugosa" specimen
L. firmum, Nyl. (Collema plicatile, Leight) *	R. pollinaria, Ach.
Calicium hyperellum, Ach.	Peltigera polydactyla, Hffm.
C. curtum, Borr.	Parmelia physodes, L.
Trachylia stigonella, Fr., an uncommon species	P. saxatilis, in fruit (which is rare) on a tree
	P. perlata, L.

* Mr. Holmes points out that this rather rare species is a true *Leptogium*, having a cellular surface.

- | | |
|---|-----------------------------------|
| Physcia parietina, L. | L. phlogina, Ach., a rare species |
| P. parietina, var. lychna, Ach. | Pertusaria fallax, Pers. |
| P. (Pannaria) elæina, Whlb., a rare species | Phlyctis agelæa, Ach. |
| P. stellaris, var. tenella, Scop. | P. argena, Ach. |
| P. pulverulenta, Schreb., var. pityrea, Ach., common, in fine fruit | Lecidea rubella, Ehrh. |
| Placodium variabile, Pers., a rare species | L. albo-atra, Hoffm. |
| Lecanora subfusca, L., var. albella, Pers., an uncommon species | L. parasema, Ach. |
| L. galactina, Ach. | L. myriocarpa, DC. |
| L. parella, L. var. Turneri, Sm. | L. endoleuca, Nyl. |
| L. pyracea, Ach. | L. sabuletorum, Flk. |
| L. aurantiaca, Lightf. | L. canescens, Dicks. |
| L. glaucocarpa, Wahl., var. pruinosa, Sm. | Graphis scripta, Ach. |
| L. athrocarpa, Dub., a rare species | Opegrapha vulgata, Ach. |
| | O. viridis, Pers., a rare species |
| | Arthonia astroidea, Ach. |
| | Verrucaria gemmata, Ach. |
| | V. glaucina, Ach., common |
| | V. biformis, Borr. |

COLEOPTERA OF THE BROUGH AND MARKET WEIGHTON DISTRICT.

BY E. B. WRIGGLESWORTH.

ALL the beetles mentioned in the annexed catalogue were collected during the rambles of the Yorkshire Union of Naturalists at the above places, on the 10th June, 1878, and 4th Sept., 1880.

So far as my experience of these districts proves by two days' investigation, I am assured many good additions to our Yorkshire list might be added by a more careful and lengthened search. There is probably no portion of our county better adapted to the habits and requirements of that numerous and interesting group of British beetles, the Hydradephaga, than this part of the East Riding. The many ponds and dykes which line the roads in all directions give ample proof of their existence. A more frequent examination of these spots might produce a rich harvest, especially in the large family Hydroporus, which I think is not so well known as it might be. The extensive and varied flora of that neighbourhood, together with its situation near the coast, is also greatly in favour of its productiveness.

I am always glad to get over "new ground," and, in consequence, have often to be satisfied with small mercies; but the two rambles here mentioned left nothing to be desired, save a wish to remain a

sojourner some short time longer, for I believe a resident entomologist might in a season make a formidable "log" (to use a nautical expression), for which the Yorkshire Union would be thankful.

The following is a list of species captured at from Brough to South Cave, and the district adjacent to and along the side of the high road from Holm-on-Spalding Moor to Market Weighton :—

GEODEPHTAGA.

Notiophilus biguttatus, Fabr.
Cychrus rostratus, Linn.
Carabus granulatus, Linn.
Nebria brevicollis, Fabr.
Clivina collaris, Herbt.
Lebia chlorocephala, E. H.
Badister bipustulatus, Fabr.
Patrobus septentrionis, Dej.
Calathus melanocephalus, Linn.

v. nubigena, Halid.

v. apicalis, Newm.

Anchomenus prasinus, Thunb.

A. dorsalis, Daws.

A. parumpunctatus, Fabr.

Olisthopus rotundatus, Payk.

Stomis pumicatus, Panz.

Pterostichus cupreus, Linn.

P. vulgaris, Linn.

P. melanarius, Ill.

P. madidus, Fabr.

P. striola, Fabr.

Amara apricaria, Payk.

A. familiaris, Duft.

A. communis, Panz.

Harpalus brevicollis, Dej.

H. cribellum, Daws.

H. æneus, Fabr.

Bradycellus Verbasci, Duft.

B. rufulus, Dej.

Bembidium rufescens, Dej.

B. biguttatum, Fabr.

B. lampros, Hbst.

B. concinnum, Steph.

B. nitidulum, Marsh.

HYDRADEPHTAGA.

Hydroporus planus, Fabr.

H. palustris, Linn.

H. lineatus, Fabr.

Colymptes fuscus, Linn.

Agabus didymus, Col.

A. conspersus, Marsh.

A. bipustulatus, Linn.

Dytiscus marginalis, Linn.

Acilius sulcatus, Linn.

A. Scoticus, Steph.

Jeybius ater, De G.

J. uliginosus, Linn.

Gyrinus natator, Linn.

PHILHYDRIDA.

Hydrobius fuscipes, Linn.

Cercyon melanocephalum, Linn.

NECROPHAGA.

Silpha rugosa, Linn.

Necrophorus humator, Fabr.

N. ruspator, Er.

Cychramus fungicola, Heer.

CORDYLOCERATA.

Byrrhus pilula, Linn.

Dorcus parallelopipedus, Linn.

Sinodendron cylindricum, Linn.

Aphodius erraticus, Linn.

A. fossor, Linn.

A. fimetarius, Linn.

A. ater, De G.

Geotrupes stercorarius, Linn.

G. vernalis, Linn.

Melolontha vulgaris, Fabr.

PRIOCERATA.

Trachys minutus, Linn.

Athous hæmorrhoidalis, Lac.

Agriotes lineatus, Linn.

Telephorus abdominalis, Fabr.

T. lividus, Linn.

v. dispar, Fabr.

T. bicolor, Panz.

RHYNCHOPHORA.

Cionus Blattariæ, Fabr.
 Otiorhynchus picipes, Fabr.
 Phyllobius alneti, Fabr.
 P. argentatus, Linn.
 P. Pomonæ, Oliv.
 P. uniformis, Marsh.
 Liophlacus nubilus, Fabr.
 Sitones suturalis, Steph.
 Apion violaceum, Kirby.
 A. miniatum, Sch.
 A. assimile, Kirby.

EUCERATA.

Rhagium bifasciatum, Fabr.

PHYTOPHAGA.

Lema melanopa, Linn.
 Chrysomela staphylea, Linn.
 C. polita, Linn.
 Phratora Vitellinæ, Linn.
 Gastrophysa Polygoni, Linn.
 G. Raphani, Linn.
 Phaedon cochleariæ, Fabr.
 Ademonia Caprææ, Linn.

Thorns, Wakefield.

Sphaeroderma testacea, Payk.
 Cassida equestris, Fabr.

TRIMERA.

Coccinella bipunctata, Linn.
 var. do.
 C. 5 maculata, Fabr.
 C. variabilis, Ill.
 C. 19 punctata, Linn.

HETEROMERA.

Pyrochroa rubens, Fabr.

BRACHELYTRA.

Aleochara lanuginosa, Gr.
 Tachinus rufipes, De G.
 T. subterraneus, Linn.
 Tachyporus obtusus, Linn.
 T. solutus, Er.
 Quedius tristis, Gr.
 Creophilus maxillosus, Linn.
 Ocypus olens, Mull.
 O. brunnipes, Fabr.
 Philonthus æneus, Rossi.
 Homalium lucidum, Er.
 ? iopterum, Steph.

 THE LEPIDOPTERA OF ARRAN.

BY HENRY LUPTON.

BELIEVING that the Lepidoptera of the Isle of Arran are not much known, I purpose giving a short description of what we observed there during a few days in July this year. Mr. G. H. Kenrick of Birmingham, Mr. W. Buckton of Leeds, and myself spent from the 6th to the 16th of July on the island; with one or two slight exceptions we had fine weather, and generally a gentle breeze. We made Brodick the head-quarters for the first three days, and afterwards slept at Corrie, six miles further up the coast. As we had no information respecting localities for insects, we were unable to do so well as we might have done, had we known where to work for different insects. The total number of species observed is divided into 13 butterflies, 15 bombyces, 26 noctuæ, and 32 geometræ; we did not collect micros.

As is frequently the case when in pursuit of insects, what appeared to be a favourable spot or a good evening for them, turned out often very badly. Sugaring was very discouraging at Brodick ; we sugared, on two nights, palings for the distance of a mile at the side of a plantation, and very near an open moor of heather, &c., and the only result was one common *Noctua*.

At Corrie we sugared on four evenings—twice in one place, and twice in another, both times on low levels near the coast. One evening we counted nine moths of the five commonest species that visit sugar, and on the other three nights not even so many. Netting, both in the daytime and in the evening, produced by far the most insects ; the best we got in the evenings were *Dasydia obfuscata*, *Pelurga comitata*, *Hepialus velleda*, and *Agrotis valligera*. *Obfuscata* is, I think, the best insect we took ; this we found a mile from Brodick, on the Lamlash-road, on a small piece of moorland, and for about half an hour on two evenings it was tolerably abundant. During the rest of our stay we only met with three specimens in other localities—one at rest on rock, and two flying. *Comitata* occurred one evening on the sandhills at North Sannox, and we captured ten. *Valligera* also occurred there, and on one evening only we took five, over flowers. *Velleda* was tolerably abundant on several evenings.

During the daytime, by searching trees, palings, &c., we found one *Hadena contigua*, several *Cymatophora duplaris* one *Notodonta camelina*, one *Ellopiia fasciaria*, *Venusia cambrica* abundantly, one fine variety of *Boarmia repandata*, *Larentia cœsiata*, and *Cidaria immanata* in thousands ; several *Coremia propugnata* and *Tanagra chærophyllata*. By beating the trees, most of which are birch and alder, we obtained a few larvæ, viz :—*N. dictœoides*, *N. dromedarius* and *N. ziczac*, *C. ridens*. *A. menyanthidis*, three *Drepana* —— ? (which died), and *S. illustraria*. On heath and heather we found *L. quercus* and *S. carpini*, the latter abundant ; these were full fed by Aug. 15th.

The following were also observed on the island :—

P. brassicæ	A. Selene, one
P. rapæ	P. phlæas
P. napi	L. Alexis
S. Janira	H. hectus
S. Semele, a few at Catacol, rather small and dark	H. humuli
C. Davus, abundant on the hills	H. velleda, several
C. Pamphilus	H. sylvinus, one
V. urticæ	N. dromedarius, a few larvæ
A. Adippe, sparingly	N. ziczac do.
A. Aglaia do.	N. dictœoides do.
	N. camelina, one specimen

- | | |
|--|--|
| E. russula, one specimen | P. pulchrina, one at rest |
| C. plantaginis, several | P. interrogationis, a few flying in sun,
and also at dusk |
| B. rubi, one larva | R. crategata |
| B. quercus, several larvæ | M. margaritata, very abundant |
| S. carpini, larvæ abundant | E. fasciaria, one |
| P. lacertula, one | C. elinguaris, a few |
| D. falcataria, do. | B. repandata, one fine variety |
| C. duplaris, several | D. obfuscata, several |
| C. ridens, one larva | V. cambrica, abundant |
| A. menyanthidis, two larvæ | A. fumata and A. aversata |
| L. impura, at sugar | C. pusaria |
| L. pallens do. | H. wavaria and H. defoliaria, larvæ |
| X. polyodon and X. lithoxylea | L. cæsiata, very abundant on some of
the hill-sides |
| A. oclea | L. pectinitaria |
| M. strigilis | E. albulata |
| C. cubicularis, two | E. lariciata |
| A. valligera, a few | Eupithecia ? three species undeter-
mined |
| A. exclamationis | M. ocellata |
| A. porphyrea, abundant over heather
at dusk | M. rivata or subtristata |
| A. agathina, one larva—died | M. montanata |
| T. pronuba | C. propugnata, several |
| N. augur, one at sugar | C. bilineata, very abundant |
| N. plecta | C. immanata, in hundreds on sides of
rocks |
| N. brunnea, flying at dusk | P. comitata, a few in one locality |
| N. festiva | E. palumbaria |
| T. stabilis, larvæ | A. plagiata |
| P. meticulosa | T. chærophyllata, in one locality |
| E. lucipara | |
| A. contigua, one at rest | |
| H. adusta | |
| A. myrtilla, one | |

Arran is easily accessible from the centre of Yorkshire in twelve hours, *via* Ardrossan, and a fortnight can be spent there very well without exhausting all the points of interest. There is one large hotel at Brodick ; in the other villages hotel accommodation is limited, but as far as our experience went, it was clean and comfortable. The summit of Goatfell (about 3000 feet) is the highest point in the island, and from it we get extensive views of the mainland and the Isles of Bute on one side, and on the other the Mull of Cantyre and (on fine days) the Irish coast. Goatfell can be ascended from Brodick in two hours and a half. Should I go again, I should endeavour to make a better acquaintance with the west side of the island, which I hardly know. Catacol would make a good point to start from, and then work down the coast by Blackwater Foot and round by Whiting Bay and Lamlash. I have no doubt that there is much to be done entomo-

logically, and shall hope, on a future occasion, to meet with several insects usually found in Scotland—e. g., *Cassiope*, *ericetata*, and *occulta*, besides many common species that were not obtained.

Leeds, October, 1880.

Rainfall for October.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 6·33	17	31·64	* 26·90	27	2·24
HALIFAX...(F. G. S. Rawson)	360	5·84	13	36·11	36·92	...	...
BARNSEY ... (T. Lister) ...	350	6·70	18	33·30	25·06	27	2·29
INGBIRCHWORTH (do.)	853	7·13	18	39·40	32·51	27	1·70
WENTWORTH CASTLE (do.)...	520	7·01	16	32·75	27·24	27	2·18
GOOLE ... (J. HARRISON) ...	25	4·98	13	27·89	21·24	27	1·58

* This is the average to date for 14 years, 1866-79.

Short Notes and Queries.

CORRECTION.—The hepatic recorded in the *Naturalist* for last month as *Porella pinnata*, is not that species, but *P. rivularis*. I first doubtfully named it *Phragmicoma Mackaii* (as I had not seen either that species or *P. rivularis*), and sent it to Mr. Lees as such, who shortly afterwards replied—"Your *Phragmicoma Mackaii* is *Porella pinnata* Ldg., in which name I am positively confirmed by Dr. Carrington." Of course I bowed to this decision, though I could not make it agree with Cooke's description and figure. The figure in the same work of *P. rivularis*, with serrate leaves, is apt to mislead, as all the above specimens had entire leaves. Another more experienced person than myself said "my *Phragmicoma* appeared to be right." Mr. Pearson has made a thorough examination of the specimen, with the above result. On page 54, line 10, read "which I first named *Timmia*" for "which I find named *Timmia*." On the same page, line 22, omit "*had*." On page 60, line 11, insert "*Douk Ghyll*" after *lacunosum*.—WM. WEST.

THE "MILLER'S THUMB."—On the 16th of February, 1876, a green sandpiper was sent into Norwich to be stuffed, which had choked itself with a small "Miller's Thumb." I saw both the bird and the fish. This is not an uncommon event with Dabchicks. It has happened in the case

of the water rail. I find a note of my father's dated 31st Jan., 1838, of an instance of the kind. He says:—"Water rail.—On the morning of this day (the 31st), one of these birds was found dead, in a ditch on these meadows (Earlham, near Norwich), with a miller's thumb about three inches in length in its mouth. The broad head of the fish had stuck in the bird's throat; the two small sharp spines with which it is armed on each side of the head being fixed in the inside coat of the rail's throat, having one of them actually perforated through the outer skin as well, suffocation had ensued. About two inches of the tail part of the fish was hanging out of the water rail's mouth. As the bird was in very good condition it would not appear that it had been pressed by hunger to swallow so large a morsel. The bird was only just dead and was brought to me in exactly the state which I have described, and so firmly was the fish fixed that I was obliged to have recourse to a corkscrew to extract it from the throat of the bird. The water rail would appear not to be very select in its diet. In the York Museum the throat of one is preserved, which was choked by the swelling of some large peas which it had swallowed, and which are still to be seen in the dried gullet."—J. H. GURNEY, Jun., Northrepps, Norwich.

LATE SWALLOW.—I saw a swallow here (Ryburne Valley) flying strong on the wing after insects, yesterday afternoon, Nov. 14th.—F. G. S. RAWSON, Thorpe, Halifax, 15th Nov.

GREAT GREY SHRIKE (*Lanius excubitor*).—A fine male specimen of the above bird came into my possession, shot near here on November 18th.—GEO. PARKIN, Brampton, Cumberland.

Dasypolia Templi, &c.—*Dasypolia Templi* has this autumn again been very plentiful in the Huddersfield district, and has been taken in large numbers by different collectors. *Celœna Haworthii*, too, I found in abundance on the Marsden moors, early in September.—G. T. PORRITT.

WATCHING A BEETLE.—I think I have discovered something new in the economy of a beetle, the identical specimen I enclose. I was sitting on a rock at Sea Point, (a suburb of Cape Town), smoking and thinking of the beautiful sea which was busy in its efforts to dislodge the spotted mineral boulders, when I noticed my gentleman walking about intent on spoil. First he went in for a feed off the flower (also enclosed with its leaf), which I presume is a kind of dandelion. Off he trudged again, and after a long promenade, came to a dead standstill. What's up? queried I. He raised himself gently on his forelegs, and lifted his abdomen aloft, then allowed it to fall with (for him) a very large noise as the result; this he repeated several times, and then walked off again. At each small pebbly place, succeeding a run of green grass or vegetation, he stopped and tapped again. Suddenly I noticed a sort of spider jump up from underneath one of the stones, and the beetle "jawed" him up like a shot. Excuse this unscientific language, please, but it is very expressive. Now I

want to know if this is the method in which our friend obtains his delicacies ; but whether or not, I venture to think the fact is worth knowing. I shall be particular in watching the species further. Quite a couple of hours were devoted to Mr. Beetle, when I was obliged to run to catch our departing steamer. I have enclosed specimens, also a small cockroach, the pest of the vessel, and a species of *Zygaena* (found in swarms at Kondebosch, near Cape Town), and I want you to get me the names of all three, as they will be useful to me.—S. D. BAIRSTOW, Steamship *Balmoral Castle*, off Cape Town, September 30th. (Extract from letter to Mr. Porritt.)

ROCKS MICROSCOPICALLY EXAMINED.—On the 22nd of November, Mr. Thomas Tate, F.G.S., delivered an address before the Leeds Geological Association, in the Yorkshire College (chairman, Professor Green, M.A., F.G.S.,) his subject being—"The Determination of the Mineral Constituents of Eruptive Rocks Microscopically." The optical behaviour of mineral crystals in thin slices beneath the microscope may be observed in four ways. By transmitted light they appear either colourless, coloured, or opaque. They may next be examined by the polariser alone, when some will shew alterations of the colour from light to dark shades as the polariser is rotated (dichroism), while others will remain unaffected (non-dichroic). If the analyser be now added, those minerals which depolarise light will give more or less brilliant chromatic effects when the polariser is rotated (anisotropic) ; while other crystals will give no colour changes, but will merely darken between crossed prisms (isotropic). The glassy forms, for example (obsidian, tachylite, &c.), are isotropic. The commonest colourless sections are those of quartz, feldspars, leucite, nepheline, enstatite, olivine, apatite, all of which are usually anisotropic save leucite, which grows dark between crossed Nicols, and apatite, which remains bright in all positions of the prisms. Enstatite is also dichroic. Muscovite, brotite, hornblende, hypersthene, augite, and diallage are coloured—anisotropic and dichroic—except the last two, which are non-dichroic. Magnetite and iron-pyrites are opaque ; but viewed by reflected light, the former is of a leaden and the latter of a brassy hue. The advantages which this most recent method of research offers are very decided. By it the investigator is enabled to determine most accurately the character and relative amounts of the constituent minerals present in compact micro-crystalline rocks, whose constitution has been hitherto little more than guessed. The large crystals in rocks having a more granite structure, are by this method often found to be crowded with enclosures of foreign minerals entangled during the process of consolidation, the presence of which, in hand specimens, would be unsuspected, but which must vitiate their chemical analysis ; and this fact, revealed by the microscope, doubtless accounts for the wide variation in the published percentage of the chemical elementary constituents. Further, by a careful study of the glassy forms, with their fluxion structure of streaming microliths or embryo crystals surrounding the entangled crystals, and the

spherulitic structures subsequently developed, or by tracing the sequence in which the minerals have crystallised out of the fused magma, and the order in which these crystals have been caught up and imprisoned within each other, the observer is enabled to work out the life-history both of the rock mass and its individual particles, and to read in legible characters the natural history of the eruptive rocks. Mr. Tate exhibited original drawings and microscopical slides of igneous rocks, including a series prepared from chippings made by workmen in paving the streets of Leeds.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Nov. 9th, Mr. T. Lister presiding.—Several communications to him were read by the president, with observations made by others. The most important features were the late stay of summer migrants, notwithstanding the severe season and ice-storms experienced. On October 23, swallows in small flocks were seen by Mr. Lister near the town, and on the telegraph wires at Darfield; stragglers Nov. 6 by T. Rose, and Nov. 8 by E. Brady, jun.—both near the town, and one obtained at Redditch, near Manchester, Nov. 9th. Martins noted nearly as late (Nov. 4) over the Calder, reported by Mr. F. Laxton, Brighouse; five seen on the 5th by Mr. T. Dymond, of Burntwood Hall, near Barnsley. A swallow was reported Nov. 4th, by Mr. T. Ormerod, of Brighouse, near the canal there. These cases show a wide range of occurrence, and mostly in companies—contrary to the experience of some good naturalists this season. Last report of white-throat Sept. 21, whinchat Sept. 8, spotted flycatcher 22nd, willow warbler same date; Oct. 5, landrail, 16th, sedge warbler caught at Dr. Payne's, Newhill Hall, and liberated; 31st, wheatear near Burton Grange Abbey, and chiffchaff heard by Mr. Tomlinson, woodman, at New Park Spring; same day, Ray's wagtail seen in numbers with the pied wagtail, the resident species, in Dodworth-road. A puffin, inland, was sent to the president by Mr. W. Dransfield, of Penistone; it was caught in a field Nov. 2nd, fed on flesh, and died two days afterwards. It proved a young puffin (the bill not being developed), with the peculiar form which obtains for the adult bird the name of sea parrot, and is a rare visitant here. Of winter visitants, the jacksnipe was reported by Mr. J. W. Salter; it had been wounded, and probably stayed all summer. He saw the great grey shrike Oct. 23 (very rare), the tree creeper and coletit at Nostell, also herons, kingfishers, wigeons and scaup duck. Mr. E. Hailstone reports (Nov. 6) "wigeons have come back to Walton Lake, and a stoat was caught on the island before the Hall, which had gone over the bridge." Several kestrels, a sparrow hawk, sea-gulls, and hooded crows have been noted about Barnsley, and field-fares, in flocks, were seen Oct. 2nd.—T. LISTER.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, 1st November. The following were the exhibits:—skin of the wandering

albatross caught on a voyage from New Zealand, presented by Mr. Wm. Kitchen, West Vale ; specimen of crystallized lime, by J. Whitley. The arrival of the winter migrants, as observed by C. C. Hanson, were red-wings, Oct. 10th ; fieldfares, Oct. 23rd ; swallows and martins last seen Oct. 10th, so that summer and winter migrants were seen on the same day. Short-eared owl (*Otus brachyotus*), shot on Greetland Moor by D. Wood, on the 29th Oct.—WM. H. STOTT.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—402nd meeting, Oct. 19th, Mr. B. Holgate, F.G.S., president, in the chair.—Mr. W. B. Turner, F.C.S., showed *Isthmia enervis*, *Licmophora flabellata*, *Terpsinoe musica*, *Synedra gracilis*, *S. tabulata* and other diatoms. Mr. F. Emsley showed a water-flea (*Bosmina longirostris*), &c. Mr. Roebuck exhibited the small *Sirex gigas* recorded at p. 59 of the *Naturalist* ; also shells, *Ancylus fluviatilis* from the Oak Beck, Harrogate, and *Helix pulchella* from Old Camp, near Fewston. Mr. W. Nelson brought Selby shell captures, *Valvata piscinalis*, *V. cristata*, *Bythinia Leachii*, *Planorbis nitidus* and *Helix nemoralis*, vars. *unicolor*, *fasciata*, *interrupta*, *coalita* and *bimarginata*, and a beautiful white example tinged with violet near the mouth. Mr. H. Pollard showed *Helix rupestris*, from Hawes ; *Pupa secale* from Clifton, Bristol ; *Bulimus acutus*, Burnham ; *Clausilia rugosa* var. *dubia*, Masham ; a distorted *Clausilia laminata* from Micklefield, and typical one from Bristol.

403RD MEETING, Oct. 26th, Mr. H. Lupton, v. p., in the chair.—Mr. F. Greenwood, M.R.C.S., exhibited a sheep's brain, so prepared as to admit of easy handling. Mr. Walter Buckton showed *Noctua baja*, *Xylophasia rurea* var. *combusta*, and typical specimens, and a very dark variety of *Miselia oxyacanthæ*, taken at sugar at Bramley Fall Wood. Shells were shown by Mr. H. Marsh ; Mr. H. Pollard exhibited those of *Limax maximus* from Barwick-in-Elmet ; *L. agrestis* from Faversham ; *Zonites cellarius* var. *albida* from Micklefield ; *Helix virgata* from Weston-super-Mare ; *H. ericetorum* (extremely thin) from Wexford ; *Limnæa glabra* and *L. palustris* var. *conica* from Hammersmith ; and an unusually large *Anodonta cygnea*, from Shepherd's Pond, Leeds. Mr. Thos. Rees showed some soft sandstone from Alum Bay, Isle of Wight ; the president, rock specimens of siliceous and calcareous deposit from running water, from America ; Bakewell, in Derbyshire ; and Yorkshire. Other things were brought by Messrs. Abbott, W. H. Hay, and F. Emsley.

404TH MEETING, Nov. 2nd.—Mr. Frederick Coates brought the nest and eggs from the heart of a tree, described at p. 57. Mr. Clarke, on seeing them, found his surmise as to the species correct, the eggs being those of the blue tit. Mr. Pollard showed *Mytilus modiolus* from the Dogger Bank, encrusted with *serpulae*, *balani*, and *polyzoa*. Mr. H. Marsh showed liassic fossils from Whitby, including *Ammonites communis*, *A. bifrons*, *A. elegans*, and a species of *Rhynchonella*. Numerous microscopic exhibits were also made.

405TH MEETING, Nov. 9th, Mr. H. Lupton, v.p., in the chair.—Microscopical display by Mr. T. Emsley. Mr. H. Pollard showed *Limnæa peregra* var. *ovata*, and *L. auricularia* from Hornsey; *L. stagnalis*, var. *labiata* from Hammersmith; and *L. peregra* from Sleights, and Saltburn-by-the-Sea, in which latter locality they were taken in a brackish stream, the examples shown being coated with a confervoid growth. Mr. W. B. Turner, F.C.S., showed two sea-urchins from Flamborough, *Echinus miliaris* and *E. purpureus*. Mr. Lupton exhibited *Anchocelis litura*, two light-yellow specimens of *Xanthia ferruginea*, *Noctua xanthographa*, very red examples of *N. baja*, and *Boarmia rhomboidaria*, all from Newlay; *Cidaria immanata* from the Isle of Arran, N.B.; *C. russata* and *Eubolia mensuraria*, from Bishop's Wood. Mr. C. Smethurst showed a long series of variations, some very pronounced, in a single batch of *Arctia caja* which he had bred. He also remarked the unusual abundance of larvæ of *Triphaena pronuba* in his garden at Burley, and described the life history of the celery fly (*Triphleba onopordinis*) as observed there.

406TH MEETING, Nov. 16th, president in chair.—Letter from F. G. S. Rawson read, noting late swallow (see p. 76). Mr. James Abbot exhibited desmids and freshwater algæ (*Staurastrum*, *Hyalotheca*, *Cosmarium*, *Closterium*, &c.). Mr. W. Barwell Turner, F.C.S., a gathering made by Mr. A. W. Wills, at Capelcurig, Sept. 30th, of desmids, it has yielded about fifty species, of which ten or twelve are new to England, and several entirely undescribed. Among the rarities were *Staurastrum*, *ophiureæ*, *S. Brasiliense*, *S. Pringsheimii*, *Docibium nodosum*, &c. Mr. J. W. Dixon showed potato-fungus (*Peronospora infestans*), and galls. Mr. F. Emsley showed insects under the microscope. Mr. C. Smethurst showed beetles and *Apamea unanimis* larvæ from Thorp Hall, near Knostrop. Mr. H. Pollard showed Surrey specimens of *Helix pomatia*, and a distorted *Anodonta cygnea* from Roundhay. Mr. William Nelson exhibited *Helix labyrinthica* (Say)—fossil from the Eocene, Isle of Wight, and recent from Wisconsin, U.S.A.—WM. DENISON ROEBUCK.

OVEDEN NATURALISTS' SOCIETY.—Monthly meeting, October 30th.—A number of geological specimens were exhibited by Mr. S. Cockroft from Ringby quarries, viz.:—*Calamites cannaeformis* and *Halonina regularis*, also a few specimens from Hailsworth Moor, near Ripley, Middle Dale, sent to Mr. Sutcliffe, and pectens from the oolite. Mr. T. Hirst exhibited a fine specimen of a young leopard shot by a Clayton gentleman in Africa, and a barn owl shot by Mr. Fletcher, of Midgley.—JOSEPH OGDEN, Sec.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, Nov. 3rd, the president (Mr. J. Wainwright, F.L.S.), in the chair.—Mr. Sims showed *A. occulta* dark form, *H. rectilinea*, *P. interrogationis*, two forms of *O. dilutata*, and a female specimen of *D. templi*. Mr. Marson reported the hoopoe (*Upupa epops*, L.), shot at Crofton, October 29th.—J. W. SHAW, Hon. Sec.

Diary.—Meetings of Societies.

- December 1. Wakefield Naturalists' Society.
 „ 2. Linnean Society of London, 8 p.m.
 „ 7. Leeds Naturalists' Club, &c.—Annual Meeting, &c., 8 p.m.
 „ „ Liversedge Naturalists' Society.
 „ „ Bishop Auckland Naturalists' Field Club.
 „ 8. York and District Naturalists' Field Club.
 „ 9. Dewsbury Naturalists' Society.
 „ 10. Huddersfield Scientific Club.
 „ 13. Huddersfield Naturalists' Society.
 „ 16. Linnean Society of London.
 „ 20. Manchester Cryptogamic Society.
 „ 27. Lancashire and Cheshire Entomological Society.

LIVING PUPÆ for sale. *Podalirius*, *Euphorbia*, 5d. each; *Machaon*, *Tilix*, *Ligustri*, *Elpenor*, *Carpini*, *Polyserena*, *Derasa*, *Urticæ*, *Scrophulariæ*, *Reclusa*, 4d. each, or 3s. 6d. per dozen; *Percellus*, *Amphidamia*, *Jolas*, *Asteris*, *Anachoreta* 6d. each; *S. Pinastri*, *Convulsi*, *Galii*, *Saturnia*, *Pyri*, 9d. each; *Antropos*, *Flamea*, 1s. each; *Populi*, *Ocelatus*, *Megacephala*, *Rumicis*, *Capsincola*, *Verbasci*, *Batis*, *Virgaureata*, 3d. each; *Vanessa Levana*, *Bucephala*, 2d. each; *Menthastris*, *Jacobæ*, *Pisi*, 1s. per dozen. Fertile ova “*Clifden Nonpareil*,” 2s. per dozen; *C. Nupta*, 20 for 1s. Birds' Eggs, Vultures, Eagles, Kites, Buzzards, Falcons, Harriers, Owls, Storks, Cranes, Herons, Egrets, Ibis, Caspian Tern, and other species. Lists on application.

J. & W. DAVIS,

Naturalists, Hythe Street, Dartford, Kent.

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of “The Birds of Yorkshire,” by Mr. W. E. Clarke, M.B.O.U.; of an “Annotated List of the Land and Fresh-water Mollusca of Yorkshire,” by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on “Yorkshire Macro-lepidoptera in 1877,” by Mr. G. T. Porritt, F.L.S.; one on “Yorkshire Micro-lepidoptera in 1877,” by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on “Yorkshire Diptera,” and on the Yorkshire species of Hemiptera of the Family *Psyllidæ*; and a report on Yorkshire Botany in 1877, by Dr. H. F. Parsons, F.G.S.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' “Moss-Flora of the East-Riding”; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichnæumonidæ*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

THE TRANSACTIONS are supplied to subscribers of 5/- and upwards annually to the funds of the Union. Intending subscribers are invited to send their names to either of the Secretaries.

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BIRD-LIFE AT THE FARNE ISLANDS.

WM. EAGLE CLARKE,

MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION.

THERE is not, so far as my experience goes, a more interesting scene than that afforded by a visit to one of the great breeding stations of the sea-fowl at the height of the season. Here, assembled within a limited area, for a period extending over a few weeks, are vast numbers of birds which at other times are scattered far and wide over ocean and shore, then displaying a nature of extreme wariness and suspicion, but now to be approached within a few yards, thus affording to the field-naturalist a golden opportunity of making himself familiar with their habits and plumage—to do which is his special aim. To the ornithologist, such a habitat is a perfect paradise, and even the outsider must indeed be callous to the claims of Nature on our attention, for whom the scene has not a charm.

As a breeding station, the Farne Islands present more than ordinary interest, owing to a greater number of species resorting to them than is usually found in like stations off the English coast; in this respect they are quite remarkable, and it is doubtful if they are surpassed by any other locality in the British Isles, certainly by none if area be taken into consideration. Another interesting feature is, they mark almost the southern boundary of the distribution of the eider duck in the breeding season, in fact the few miles from Coquet Island to the Tweed include all the English localities in which it breeds; this being the chief of them. On two occasions have I visited these islands—on the 18th of May, 1876, and on the 12th of June, 1877; and I propose to go over the scenes of my second visit, making such allusions to the first as may be desirable. Of course such scenes can only meet with very inadequate treatment from the pen.

The Farnes are a group of islets, rocks, and reefs, over twenty in number, composed chiefly of basalt, lying off the Northumberland coast near to its northern limit; the nearest and largest island, known as Farne Island, is about two miles from the mainland, and the others stretch away from it in a north-easterly direction for a distance of three miles. They may be reached by boat either from North Sunderland or Bamborough, both of which are a few miles from the railway from Newcastle to Berwick.

The morning of the 12th June, 1877, found a couple of kindred spirits and myself on the beach, ready to embark; the weather was fine, but what is known as "roaky"—that is, a white sea mist prevailed. The sea was calm, and the breeze favourable. After an hour's sail we made the Longstone, arriving amidst the hideous blasts of that ingenious piece of mechanism, the American fog-horn, which fortunately ceased very shortly after we landed, the mist having lifted, and the sun shining brilliantly, which it continued to do for the remainder of the day. The Longstone, the outermost of the group but one (a mere rock), is famed for having been the home of Grace Darling, and the surrounding sea the scene of that exploit which has rendered her name a household word.

The first sight which attracted attention, on nearing the Longstone, was a flock of terns fishing—a most interesting and beautiful spectacle, especially when viewed from a distance of only a few yards. The elegant forms, delicate plumage, and graceful flight of the birds were seen to perfection as, hovering over the glassy surface of the sea at an elevation of some twenty feet, their hooded heads with coral beak down-turned, intent upon their finny prey, their deeply forked tails depressed, now winnowing the air with their long sharp wings, and now precipitating themselves, gently breaking the surface with a splash, and immediately rising with their wriggling silvery prey. It was indeed a sight not to be forgotten.

On the Longstone a colony of arctic and common terns were nesting, their innumerable eggs being scattered in ones, twos, and threes on the shingle above high-water mark, so thickly crowded together that great care was necessary to avoid breaking some of them whilst selecting a few varieties for the cabinet. It is quite impossible to discriminate between the eggs of the two birds, of which the arctic species is by far the most abundant on the islands; both were easily identified as they hovered over us, screeching the whole time of our intrusion; the greater length of the tail and the darker plumage of the upper surface being distinguishing features of the arctic tern. In the midst of this great collection, forming quite a distinct group by themselves, were about a dozen of the beautiful eggs of the Sandwich tern. This is a much larger bird than the others, and the beating of the pinions deep and springy. Amongst this same crowd was a single egg of the oyster-catcher, the owner of which, in its pied coat, saluted us with its flute-like *kweep, kweep*, from an adjoining rock.

The next island visited, the North Wamses, is the great breeding resort of the puffin; having in former years abounded in rabbits, this bird finds a congenial nesting-place in the old burrows with which the turf is honeycombed, but it is, however, supposed that they frequently excavate fresh burrows for themselves. The eggs are best obtained by lifting the friable mass of hummocky turf containing the burrow, and turning it over, leaving exposed Mrs. Puffin on her solitary egg, which, in a few instances, is cradled on some green herbage, an apology for a nest. She is very loth to quit her treasure, and after being cautiously lifted off, will sit at your feet, apparently quite unconcerned, eyeing you quaintly all the time. Another method is to insert the hand an arm's length into the burrow and withdraw the bird; this requires due caution, and should be performed with a thickly-gloved hand, for the bird resents forcible ejection, and its beak is a weapon not to be despised. Most of the eggs are coated with peat, which when removed leaves a whitish egg faintly marked with brown and purple. At this date they were in an advanced stage of incubation, but on the 18th of May, the year before, fresh eggs were plentiful. It is a pleasure to be able to state that this species has largely increased in numbers since the days of Mr. W. C. Hewitson, the author of our standard work on British Birds' Eggs, and a gentleman thoroughly acquainted with the avifauna of the Farnes. Numerous nests of the lesser black-backed gull, the most abundant species occurring on the islands, are deposited in the depressions of the rock and turf; they are large structures of coarse grass lined with finer grass, and occasionally a few feathers. On this visit the eggs had been systematically taken during the past four weeks for sale on the mainland, where they are highly prized for domestic purposes, and I was much struck by the smaller size and the fantastic colouring and marking of the eggs, which exhibited a wide divergence from the typical specimens. Some of these had the appearance of having been dipped in ink, others were pale blue, and many had huge blotches of black and other tints. No doubt by some persons these would be considered as fine varieties, but in my opinion it is to be attributed to degeneration, the result of over-production from frequent robbing. On the 18th of May, 1876, I accompanied the keeper on his first visit to the islands that season, for the purpose of taking the eggs. They were then very numerous, and of a large type, showing very little variety both as regards ground colour and markings, the former being a clear pale brown or a clear pale green—the former, however, being the prevailing tint, spotted somewhat finely with

various deeper tints. The lesser black-back is essentially the gull of the Farnes. They immediately assail the visitor, on his landing, with their discordant croakings, which are incessant during the intrusion. They are to a certain degree fearless, those alighting allowing a close inspection of their blue-black backs, which contrast grandly with the snowy head and under surface, and their lemon-coloured legs and richer yellow bills. Accompanying them annually are a few, very few, pairs of the herring gull, at once recognisable by their paler, dove-coloured backs and flesh-coloured legs. The eggs of this species, if wanted, must be here obtained by watching the bird on to the nest—a precaution necessary for their identification, the eggs and nest being indistinguishable from those of the lesser black-back. There were also several nests of the eider duck on this island, placed in hollows between the rocks, and in situations similar to those of the lesser black-back; they were entirely composed of down of a smoky brown tint, the shafts at the point of insertion being paler, giving to the structure a spotted appearance. Eider down is not white, as many suppose. This down the duck plucks from her body as incubation proceeds, until a large nest of down, held together by small particles of dry stalks, &c., has accumulated, in which the eggs (usually five in number) are almost hidden. On my visit in May, 1876, only three nests were found; two of them contained a couple of eggs which had been carefully covered with fresh-plucked weeds by the old duck on leaving. These nests did not then contain a particle of down, but were wholly composed of dry grass. When leaving the nest, the bird sometimes leaves her eggs covered with liquid excrement of a pale brownish-white colour; this may be due to fright, for I only observed it in cases where the bird was actually put off the nest. I believe that the mottled green appearance of most of the eggs is caused by this, for those in the nests containing one or two eggs only were of an uniform even pale green. Single eider's eggs were found in several instances in the nests of the lesser black-backed gull, attributable no doubt to their own nests being taken before the complement of eggs had been laid.

In 1876 a detachment of cormorants from the headquarters on the Megstone had nested for the first time on the South Wamses, and I took a few of their chalk-coated eggs from their tall nests built up of seaweed to a height of about two feet, lined with dry grasses and finer seaweed, and in one or two cases a few feathers. On approaching this island, which was the first one visited in 1876, these birds erected their tall gaunt forms, looking from a distance like so many

champagne bottles ; they soon after took flight, and we had to make all haste to the nests to anticipate the gulls, ever ready to pounce down upon exposed eggs. The stench from the nests and the dung of the birds was already considerable, but nothing to what it would be when incubation has advanced, when it becomes unbearable. This year (1877) the cormorants again wished to take up their old quarters, but the gulls objected, and their numbers prevailing, the cormorants had to retire to their companions on the Megstone, which has been their station from of old. Every egg from this colony on the Megstone had been taken by some scoundrels from the mainland, and as the season was then advanced, it is tolerably certain that the Farnes in 1877 did not contribute to the numbers of this species.

The Brownsman Island is the home of numbers of gulls and the smaller terns. Eiders are, perhaps, more numerous on this island than elsewhere in the group ; under the old wall, in front of the keeper's house and the old buildings, is a favourite haunt of the bird, which at this season becomes remarkably tame, allowing an approach to within a couple of feet of the nest without showing the least sign of alarm, and many may even be stroked as they sit on the nest. The nests on this island are chiefly placed amongst nettles and other herbage. Numerous eider drakes in their handsome black-and-white plumage were floating peacefully on the sea or resting on the rocks at the water's edge. The duck, in her sober brown and grey dress, is a great contrast to her lord. Both are heavily built birds, weighing some six pounds, and have massive heads. On this island we obtained two nests, with eggs, of the rock pipit, a species not uncommon here. The nest, which is placed on the ground, is a rather loose structure of dry grasses.

Staples Island is chiefly attractive on account of its being adjacent to the "Pinnacles," a stack of three isolated basaltic columns about forty feet high, which lie only a few yards, perhaps ten, off it. To stand on this island, opposite to, and on a level with the tops of the Pinnacles is one of the sights of the Farnes ; the flat summits of these columns are the only breeding-places offered by the islands at all suited to the requirements of the guillemot. Here they sit perfectly upright, and huddled together as closely as possible. The eggs are almost as thickly laid, and so crowded that when the birds take flight in a body, they are accompanied by a shower of their eggs. When thus uncovered the eggs, especially the intense blue-green ones, have a very beautiful appearance as they lay on a surface perfectly whitened with the dung of the birds. The Pinnacles can only be approached

in the calmest weather, and are to be ascended by the aid of a ladder and a chain hung from the top of one of them; with these, it is not a very difficult task to reach the summit. On the sides of the Pinnacles we also look down upon several nests of the kittiwake, glued as it were to the inequalities on the face of the perpendicular rock—seemingly a most precarious position. There are also several more on the face of the cliff on whose brink we stand. These nests are composed of seaweed and grass; on some the birds are sitting; others are uncovered, showing the eggs; whilst a few of these elegant birds sail beneath, almost within arm's reach. There too sits a solitary female shag; she has no nest, but according to Mr. John Hancock ("Birds of Northumberland and Durham") this species has nested on the Farnes in one or two instances. A few pairs of the razorbill are also nesting in the crevices, but the guillemots object to their presence so close to their domain, and this, together with the limited space of suitable breeding ground—for it is confined to this single site—accounts for this being one of the scarcest species here. Its single egg is tolerably safe, in the cleft, from the spoon and rod used to obtain it and those of the kittiwake.

The Knoxes, the next island we visited, is one of the principal haunts of the terns; here they are found amongst the herbage, which is abundant. We had expected to find eggs of the Sandwich tern among the great numbers lying around, but only a single specimen was seen. The eider was also nesting, several nests with eggs being observed, and a flock of about thirty birds flew off as we landed. On the reef lying on the north, which is connected with the island at low water, known as the Knoxes Reef, terns' eggs were very abundant, being thickly scattered over the shingle and on the hard-dried seaweed. Amongst this immense collection were a cluster of the eggs of the Sandwich tern, from which we selected a few contrasting varieties for our collections. The variety with the white tinted ground colour was greatly in the ascendant. A nest and eggs of the oyster-catcher was also among this assemblage, and numerous empty depressions prettily surrounded with shells and white stones, the nest of this bird, were noted. The ring dotterel, a pair or two of which nest on all the islands suitable, viz., having a sandy or fine shingly beach, had also a nest, or rather a depression scratched in the shingle, containing three eggs, our last find on the Farnes. We have now worked our way back to Farne Island, the innermost of the group, on which we did not land, for it does not afford the attractions of the other islands, having a lighthouse and several other erections upon it.

On one of the islands the keeper (who resides during the season on the Brownsman) knew of a nest of the sheldrake, in burrow, containing thirteen eggs, which he did not wish to have disturbed. This species only breeds occasionally on the islands, but many nest on the extensive links of the mainland.

From the above account it will be gathered that no less than fourteen species breed annually on the Farnes; and occasionally two others, the shag and the sheldrake. Formerly a few pairs of that beautiful bird, the roseate tern, visited the group during the summer, associating with the mob of commoner members of its genus, and laying in their company; but persecution has banished them from their former haunts, and I am afraid a similar fate awaits the Sandwich tern; it can only be a question of time, for Mr. Hewitson some twenty-five years ago, speaks of the "many hundreds" of eggs of this species, on the Farnes. I should now be almost afraid to describe them as many tens. There can be no doubt that the Farnes are most unmercifully and openly robbed, to say nothing of the extensive poaching which prevails.

During the day we watched a pair of red-throated divers and several gannets fishing off the islands, exhibiting a great contrast in their modes of proceeding. The lithe forms of the divers disappeared almost without rippling the surface, whilst the gannets dropped like thunderbolts from a considerable height, plunging into the water amidst a cloud of spray.

In conclusion, I think we may fairly venture to assert that a day on the Farnes is a veritable "multum in parvo" for the lover of Nature.

Leeds, Dec. 17th, 1880.

HOW TO EXAMINE A MOSS.

BY C. P. HOBKIRK, F.L.S.

(Continued.)

IN our last paper, we left off with the split capsule, laid open on a slide under the microscope, for the purpose of examining the teeth of the peristome. Now, you will invariably find that when there is a peristome at all, whether single or double, the number of the teeth is always four or a multiple of four, *i.e.*, either 4, 16, 32, or 64. You will find that our moss has sixteen of these teeth, but if you do not examine it carefully you may be deceived, and suppose there are thirty-two,

because you can count thirty-two points, but if you look carefully you will see that there are really only sixteen teeth, and that each is bifid or split nearly down to the base, and that they are placed at equal distances from one another, forming a regular series round the mouth. You will further observe, that across these teeth, or rather across the segments of each tooth below, are a number of transverse bars, in part joining the segments together, and called trabeculæ, (from *trabs*, a beam, *trabecula*, a little beam) ; and that each tooth is composed of two layers, one, the outside, of deep lake or crimson colour, the other, the internal one yellow, and that the yellow one projects on either side beyond the red one, being the wider of the two. If this capsule be ripe or nearly so, and it should be, to be properly examined, you may find that your vision of it is much obscured and hindered by a great number of little dot-like bodies floating about it in the water on the slide. These are the spores, of which more hereafter ; at present they are in your way, and must be got rid of. This may be done by gently washing them away with a wet camel's hair brush, and then placing the capsule on another clean slide with water.

If now you examine another capsule with a good hand magnifier, you will find that its general shape is cylindrical, that it stands nearly upright from the stem which supports it, called the seta (*seta*, a hair or bristle), or sometimes you will find it a little inclined from the perpendicular. This is a character found in many capsules of other genera, but note particularly that on one side, near the base, there is a little protuberance, called a struma, hence it is said to be strumose (*struma*, a swelling in the neck, a wen,) and that there are a number of lines or low ridges running from the apex to the base ; it is thus what is called striated (*stria*, a ridge).

Having made yourselves so far master of the structure of the generative organs of your moss, turn to the analytical key at the beginning of Wilson's Bryologia, or my Synopsis, which is nearly, but not quite the same. You find your moss is acrocarpous, of division B, capsule with a deciduous lid : Sect. II, peristome single : Sub-div. II, calyptra dimidiate : b. calyptra not inflexed at the base : * * * teeth 16, deeply bifid, equidistant : ‡ ‡ ‡ capsule cernuous or inclined, unequal ; and on reading over the first generic diagnoses under this section, you will find your moss is of the genus *Ceratodon* (see p. 11, Hobk. Syn.) You have now attained the first step in your examining process, and should, on having reached this point, have gained some considerable insight into the structure of mosses generally ; at the same time, the method you have been pursuing is, in its main features, a purely artificial

method, and in that respect resembles the Linnean system of counting the anthers and stigmas among the flowering plants, thereby grouping together very dissimilar genera, which in a natural system would be placed much further apart. At the same time, for a beginner it is useful, like the Linnean system, in enabling you to get at the genus of a moss without much trouble. You will further observe that in this key, as we may call it, the greatest stress is laid upon the presence or absence of the peristome, and, when present, of the number of teeth, for the purpose of forming the sections and the genera. This method is, however, now gradually becoming discarded, and a more natural grouping—as in flowering plants—is being adopted. Such genera as *Pottia* (l. c. p. 2) and *Anacalypta* (l. c. p. 9), which in this artificial system are in two distinct divisions, the former being without peristome, and the latter having a single peristome, are by the more natural system not only placed in the same division, but are made into one genus, viz., *Pottia*, having a certain number of species bearing a peristome, and the remainder without.

There can be no question but that in a few years the natural arrangement, when it has been further perfected, will entirely supersede this artificial method, as a means of grouping and determining the limits of genera, just as has obtained amongst the flowering plants. No botanist now ever uses the old Linnean artificial method, either in grouping or in endeavouring to make out the name of any flowering plant, and the same thing will certainly ensue amongst the mosses. In the latest propounded natural system, that of the late Dr. August Jaegar, our genus *Ceratodon* is grouped under the 7th Tribe Pottiaceæ, instead of being in juxtaposition with such genera as *Fissidens* and *Dicranum*, as we find in this artificial method. There is only one species of the genus found in Britain, viz., *purpureus*; so that having found out our genus, we have in this case also found the specific name. *C. cylindricus*, of Wilson's Bry. and Hobk. Syn., is now removed to another genus, *Trichodon*.

(To be continued.)

COLEOPTERA OF LIVERPOOL AND NEIGHBOURHOOD.

BY JOHN W. ELLIS, L.R.S.C.E.

In looking through the pages of the "Flora of Liverpool" recently, it occurred to me that a list, with localities, of the beetles found in our neighbourhood, compiled after the plan of the "Flora," might be of service to those entomologists who include the coleoptera in their

studies. With the exception of two papers—one on the *Geodephaga*, the other on the *Hydradephaga* of the district, read before the Historic Society of Lancashire and Cheshire by Mr. Charles S. Gregson, which papers are printed in the Transactions of that society for 1861–2—and a few remarks on coleoptera new to the district by Mr. F. Archer, in the Liverpool Naturalists' Scrap-book (vol. 167–169), we possess no list of our coleoptera. Having therefore to rely on the collections of myself and friends (with the exception of the two groups mentioned above, where Mr. Gregson has ably paved a way for me), it will be an impossibility to give a complete list of our species; but, since a poor list is better than no list at all, as it may form the basis of a more perfect one, I trust that my endeavours in this direction will meet with approbation.

I intend to devote this occasion to a consideration of the species of the group *Geodephaga*, of which, according to Dr. Sharp's Catalogue, we possess 311 British species. In the list of *Geodephaga* of the district alluded to above, Mr. Gregson enumerated about 140 species as having been taken in our neighbourhood; since this time Mr. Archer has added one species—*Anchomenus puellus*, D; Mr. F. Kinder has added three species, viz., *Amara bifrons*, Gyll., *A. plebsia*, Gyll., and *Harpalus pemeticollis*, Pk. I myself have added seven species to this list, viz., *Notiophilus substriatus*, Wat.; *Dromius meridionalis*, D.; *Anchomenus atratus*, Duft.; *Anisodactylus pœciloides* (Steph.; *Harpalus tardus*; Px.; *Harpalus ignavus*, Duft.; and *Bembitium guttula*, F. This addition of eleven species gives us a local list of nearly half the *Geodephaga* occurring in Britain.

Although we have lost a few of Mr. Gregson's localities—such as Wallasey Pool by the formation of the Birkenhead Docks, and the sandhills beyond Hall-road station by their strict preservation,—I doubt not that if the high lands about Heswell and Thurstaston, on the marshy land between Bidstow and Leasowe (through which the rivers Birket and Tender wend their way), were explored, we should find new localities for many of the more local species, in addition to species new to our district.

GEODEPHAGA.

CICENDELIDÆ

CICENDELA.

C. campestris, L. Bidston Hill (J W E) *; on the mosses (C S G), May to July. Oftener seen than captured.

* In order to avoid repetition, I shall use the initials J. W. E.; C. S. G.; J. H. S. and F. K., for myself, Messrs. Gregson, Smedley, and Kinder respectively.

C. hybrida, L. Flying about the barest sandhills on both sides of the river, on the hottest days of summer. The variety (if it is a variety only) *maritima*—which is, I believe the usual form on the south coast—does not seem to occur in our district. The markings of this variety are very distinct from the true *hybrida*.

CARABIDÆ.

NOTIOPHILUS.

N. aquaticus, L. Very abundant in damp places among the sandhills; on Bidston and Hay Brick Hills, under stones; Leasowe Marsh. Easily recognisable by its high polished and elongate form.

N. palustris, Duft. Banks of streams, C S G. I have two specimens taken among the previous species—one from Leasowe, one from Cloughton, J W E; near Walton Gaol, F K.

N. biguttatus, F. Our commonest *Notiophilus*. Abounds under stones in moss, &c., all the year round.

N. substriatus, Wat. I have a single specimen of this species (new to the district), which I took on the Wallasey sandhills Feb., 1878.

ELAPHRUS.

E. riparius, L. Very abundant in damp hollows on the sandhills beyond Wallasey village on the hottest days in summer; very difficult to capture on account of its agility, J W E; Crosby sandhills, C S G.

E. cupreus, Duft. "In profusion on the Crosby sandhills near Bousfield's encampment ground, June," C S G.

BLETHUSA.

B. multipunctata, L. "One specimen from Crosby with *E. cupreus*," C S G. Mr. Gregson informs me that he has since taken it freely near Crosby.

CYCHRUS.

C. rostratus, L. Common in woods, C S G. One specimen near Childwall, J W E; one specimen from Bamborough station, J W S. Interesting from the creaking noise it makes when handled.

CARABUS.

C. nitens, L. Used to occur freely in the damp hollows among the sandhills between Crosby and Southport; probably occurs there still. I lately heard of a Manchester gentleman who took about 70 there in one day, many years since. It still occurs in the mosses in May.

- C. granulatus*, L. "Plentiful around West Derby, summer," C S G.
I possess four specimens—two taken by myself at the back of Leasowe embankment, and two by Mr. Johnson, J W E.
- C. monilis*, F. "Edge-lane, West Derby, Liscard, New Brighton," C S G.
- C. arvensis*, Herbst. "Prenton?" C S G.
- C. catenulatus*, Scop. "Anywhere under rubbish and old stones," C S G. I have only met with this species about Bidston Hill, where I have taken about a dozen specimens. The species must be very plentiful there, judging from the remains of specimens in the shape of elytra found there under gorse and heather, J.W.E., Sandhills, Crosby (F K).
- C. nemoralis*, Müll. I used to take freely a few years ago on the borders of Sefton Park. Since then, Mr. Smedley and myself have taken a few about West Derby. Mr. Kinder takes the species commonly about the North Docks—I believe among timber.
- C. violaceus*, L. Much commoner than the preceding species, with which it often occurs.

NEBRIA.

- N. brevicollis*, F. Our commonest ground-beetle.
- N. Gyllenhali*, Sch. "Two near Burscough Bridge, among a heap of stones," C S G. Easily recognisable by the *black* legs and antennæ, and more slender form.

(To be continued.)

Short Notes and Queries.

STORMY PETRELS AT HECKMONDWIKE—Two good specimens of the stormy petrel were caught on the 27th October—the one in the lower part and the other in the upper part of the open valley. They appeared to have been forced to the ground by the heavy fall of wet snow which had taken place during the previous night. Both died, but were preserved and mounted.—J. M. B.

PIKE WITH SPAWN.—On the 14th October I caught, with roach, four jack; two had half-digested fish in their throats, and one weighing between 2lbs. and 3lbs. contained roe. On the 27th November, at the same pond, I caught another weighing one and-a-half pounds, full of spawn, well developed. Is it usual for pike to contain spawn in autumn? I was under the impression they deposited it from March to June.—THOS. BUNKER, Goole, 11th Dec.

GREAT GREY SHRIKE AT SCARBOROUGH.—It may interest readers of the *Naturalist* to know that a fine specimen of the great grey shrike was seen in this neighbourhood on the 11th of this month, about four miles from Scarbro', near Hackness. I had a capital opportunity of observing it, and its appearance and action are capitally described by Yarrell, so that I had no difficulty in identifying it from his account of it.—W. ROBINSON, West Bank, Scarborough, December 27th.

YORKSHIRE MOLLUSCA, &c.—Will any of the readers of the *Naturalist* kindly oblige me with information, local lists, specimens, &c., of the recent and fossil marine mollusca of Yorkshire, with the view to preparing a report of the species to be found in Yorkshire? All postage, &c., will be paid by me, of course.—WM. CASH, 38, Elmfield Terrace, Halifax.

Obituary.—MR. F. T. BUCKLAND.—We regret that we have this month to record the death of Mr. Francis Trevelyan Buckland (better known as Frank Buckland), which took place at his residence, 37, Albany-street, on Sunday, the 19th ult. He was the eldest son of the Very Rev. William Buckland, D.D., Dean of Westminster, and was born Dec. 17th, 1826. He was a scholar of Winchester College, and student of Christ Church, Oxford, where he took his B.A. degree in 1848. Inheriting from his father a strong taste for physical science and natural history, he devoted himself to the study of medicine, and having served the office of house surgeon to St. George's Hospital, became, in 1854, assistant-surgeon to the 2nd Life Guards, from which post he retired in 1863. He was an extensive contributor of papers on pisciculture and on other branches of natural science, to the columns of the *Times* and of other periodicals, and conducted for many years the "Sea and River Fisheries" and "Practical Natural History" columns of *Land and Water*. He established at his own expense, the "Museum of Economic Fish-culture" (under the Science and Art Department, South Kensington), at the Royal Horticultural Gardens. This museum illustrates the cultivation of salmon, trout, and useful fresh-water fish, as well as oysters and sea fish. In 1866 he received a silver medal for his labours in the promotion of this branch of science from the "Exposition de Pêche et d'Aquiculture" at Arcachon, in France, and in 1868 the Diploma of Honour from the Havre Exhibition. He is the author of "Curiosities of Natural History" (first, second, and third series); and of "Fish-hatching." He edited, in 1858, his father's Bridgewater Treatise on Geology and Mineralogy. In 1859 he discovered, in the vaults of St. Martin's, Charing Cross, the coffin of the great surgeon and physiologist, John Hunter, which was re-interred in Westminster Abbey by the Royal College of Surgeons. For this he received the thanks of the Council of that body, and a bound copy of the Catalogue of the Hunterian Museum. The Leeds School of Medicine also presented him with a silver medal. In 1867 he was appointed Inspector of Salmon Fisheries for England and Wales, and in 1870 Special Commissioner to inquire into the effects of recent legislation on

the Salmon Fisheries of Scotland. His early death will be regretted by a large circle of his Natural History friends, to whom his genial good humour had endeared him.

Rainfall for November.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 3·24	15	34·88	* 29·75	13 & 14	·60 ·60
HALIFAX... (F. G. S. Rawson)	360	5·99	17	42·10	38·79	...	...
BARNSELY ... (T. Lister) ...	350	1·89	11	35·19	26·44	15 17 24	·31
INGBIRCHWORTH (do.)	853	...	...	...	34·83	...	...
WENTWORTH CASTLE (do.)...	520	2·27	12	35·02	28·82	24	·42
GOOLE ... (J. HARRISON) ...	25	1·75	13	29·64	22·48	17	·58

* This is the average to date for 14 years, 1866-79.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Dec. 21st, Mr. T. Lister in the chair.—A few observations were made on birds, the most rare noted being the hoopoe, on Nov. 17th, obtained at Crofton; only one had been previously recorded, brought some years ago from Wombwell Wood. The common buzzard was noted by Mr. Creighton on the same date, also on Dec. 12th. On the 30th, a white, or barn, owl was caught on a low tree, asleep, near Stainborough Park, where these and other birds are protected; a pair of magpies noted in Mr. T. Ormerod's plantations, Brighouse, many others by Mr. A. Drury, Tankersley Rectory, and by another observer about Wortley; flocks and fieldfares, redwings and missel-thrush there, and about Cudworth. Another young puffin taken near Wortley. The bird-preserver who received both birds, believes it came inland with the one captured Nov. 2nd, and made its way down the Don a day or two after. In Walton Park a flock of twelve wigeons, gold-crests, immense flocks of green linnets, starlings, &c., were noted. The keeper observed a merlin and a rough-legged buzzard about the lake.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—The sixth annual meeting was held on 7th December, when the usual annual report was presented, which gave a resumé of the society's proceedings during the year, and showed the society to be in a healthy and prosperous condition. Numerous papers on Natural History have been read, and at alternate meetings special facilities have been given for the exhibition of specimens, when many plants and insects new to the district record list have been laid on the table. After the reading of the report Mr. F. Richmond thanked

the members for their valuable assistance rendered at the Botanical Gardens in Lister Park.—The third annual soiree was held on Dec. 14th, Mr. W. West, the president, in the chair, when Mr. B. Holgate, F.G.S., and Mr. W. D. Roebuck of Leeds, addressed the members present.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, 6th December, the president in the chair, who exhibited specimens of, and read a short paper on, the wryneck. Officers for the ensuing year were elected, viz., C. C. Hanson, president (re-elected); secretary and treasurer, Albert Fielding.—W. H. STOTT.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting Nov. 29th, in the Museum, the president, Mr. S. J. Capper, in the chair.—Mr. J. L. Ellis read a paper on the coleoptera of the district, illustrated by his own collections. The paper had special reference to the Geodephaga, and recorded about 150 species as natives of this locality, several locally new species having been discovered by Mr. Ellis himself. Mr. Johnson also read some very interesting notes upon, and exhibited specimens of, *C. splendana*.

MEETING, Monday, Dec. 20th, in Liverpool.—A paper was read by Mr. Keyworth, of Alderley Edge, Cheshire, on “Stainton and Newman compared,” and the relative values of their works, more especially as text books discussed. Mr. N. Cooke, of Liscard, announced that a *Eupithecia** which he had exhibited at a previous meeting, was one undoubtedly new to Britain. It had been bred by Miss Greening, of Warrington, from larvæ found this summer in the Isle of Man. Mr. Cooke has provisionally named this species *Eupithecia Blancheata*; it seems nearly allied to *Lariceata*, but may be distinguished from other species by a dorsal row of white dots on the abdomen. The usual conversazione terminated the meeting.—W. E. SHARP, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—407th meeting, Nov. 23rd, Mr. B. Holgate, F.G.S., president, in the chair.—Lecture delivered by Mr. William Cash, F.G.S., Halifax, upon “The Fossil Flora of the Halifax Hard Bed Coal,” illustrated by the lime light.

408TH MEETING, Nov. 30th, Mr. W. Barwell Turner, F.C.S., F.R.M.S., in the chair.—Letter from Mr. Robert Lee, of Thirsk, read, wherein he noted that he had received, on June 5th, roller (*Coraceas garrula*), from Boltby; its stomach contained a mouse entire, and several beetles. On Oct. 29 a stormy petrel (*Thalassidroma pelagica*) was picked up in a dying state at Sowerby. On Nov. 17th a young great northern diver (*Colymbus glacialis*) was shot near Slingsby. Mr. C. Smethurst showed skins of the redwinged starling (*Agelæus phæniceus*), the meadow lark (*Sturnella magna*), and the golden-winged woodpecker (*Colaptes auratus*), and the

* On what tree or plant were the larvæ of this *Eupithecia* found feeding? We almost think that, when perfectly fresh, *Lariciata* has “a dorsal row of white dots on the abdomen.”

egg of the sooty tern (*Sterna fuliginosa*), from Pewaukee, Woukesha county, Wisconsin, U.S.

409TH MEETING, Dec. 7th, the president in the chair.—The eleventh annual report and balance-sheet were read. They showed the state of affairs to be satisfactory. The membership had increased from 157 to 161 during the year. The reports having been adopted, the scrutineers reported that the balloting for the new council had resulted in the election of the following :—Mr. W. Barwell Turner, F.C.S., F.R.M.S., president ; Messrs. W. E. Clarke, M.B.O.U., H. Lupton, M.E.S., Washington Teasdale, F.R.M.S., and Edward Thompson, as vice-presidents ; Mr. W. Denison Roebuck as treasurer, Mr. Walter Raine as librarian ; Mr. H. Pollard as secretary, &c. ; Messrs. B. Holgate, F.G.S., and Edwd. Atkinson, F.L.S., are also vice-presidents in virtue of being the two last presidents. The president then delivered his valedictory address, after which he was thanked for his services during the year. A vote of thanks to Mr. Roebuck on the occasion of his retirement from a nine years' tenure of the secretaryship, was also passed.—W. D. R.

OVENDEN NATURALISTS' SOCIETY.—Annual meeting, November 27th.—The following mosses were exhibited by Mr. Spencer, having been collected in the district during the last two months, and chiefly during two rambles—one in Ogden Clough, and the other in Luddenden Dale :—*Hypnum elegans* (? *Borrerianum*), *H. filicinum*, *H. palustre*, *H. rivulare*, *H. plumosum*, *Bryum pseudo-triquetrum*, *B. argenteum*, *Mnium cuspidatum*, *Bartramia pomiformis*, *Webera nutans*, *W. albicans*, *Gymnostomum rupestre*, *Plagiothecium denticulatum*, *Dicranella squarrosa*, *D. crispa*, *D. heteromalla*, and *Racomitrium aciculare*—nearly all of which have been taken in fruit. Mr. Spencer also showed two fossil ferns new to science, obtained from one of the coal balls of the Halifax coal measures. They are both well defined species. Mr. T. Hirst exhibited the following birds :—a pair of merlins, a great shrike, and a pair of jays ; also a leopard which, when killed, measured 5ft. 3in. in length. and 2ft. 6in. in height. The officers for the ensuing year were elected ; Mr. Spencer was appointed president, and Mr. Joseph Ogden secretary.

WAKEFIELD FIELD NATURALISTS' SOCIETY.—Monthly meeting, Dec. 1st, the president (Mr. J. Wainwright, F.L.S.) in the chair. Mr. Marson reported that the short-eared owl had been taken at Stanley, on Nov. 5th ; the little grebe (*Podiceps minor*) at Normanton Common, Nov. 18th ; and the great spotted woodpecker (*Picus Major*) on the 22nd inst. Mr. Wrigglesworth showed a number of coleoptera from Denby Dale, some fossil teeth from the London clay, and some shells from the lias limestone. On the motion of Mr. Wrigglesworth, seconded by Mr. Richardson, it was resolved that the society should be called the Wakefield Naturalists' and Philosophical Society. The president read the first of a series of papers, on the "Peculiarities of Plant Life," his remarks being chiefly confined to the motion of plants.

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Diary.—Meetings of Societies.

- January 4. Liversedge Naturalists' Society.
 „ „ Bishop Auckland Naturalists' Field Club.
 „ 5. Wakefield Naturalists' Society.
 „ 8. Huddersfield Scientific Club.—Annual Meeting, 8 p.m.
 „ 12. York and District Naturalists' Field Club.
 „ 14. Dewsbury Naturalists' Society.
 „ 15. Yorkshire Naturalists' Union.—Annual Meeting at York. (See special Notice).
 „ 17. Manchester Cryptogamic Society.
 „ 18. Bradford Naturalists' Society.—Opening Address by President, Mr. William West. 7-30 p.m.
 „ 20. North Staffordshire Naturalists' Field Club.—Meeting at Burslem, Local Secretary, M. A. Ellis.
 „ „ Linnean Society of London, 8 p.m.
 „ 25. Leeds Naturalists' Club, &c.—Inaugural Address by President, Mr. W. Barwell Turner, F.C.S.
 „ 31. Lancashire and Cheshire Entomological Society.

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PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding"; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LXVII.

FEBRUARY, 1881.

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ANNUAL ADDRESS, ON THE MODERN STUDY OF BOTANY,

DELIVERED AT

THE ANNUAL MEETING OF YORKSHIRE NATURALISTS' UNION,
AT YORK, 15TH JAN., 1881,

BY PROF. W. C. WILLIAMSON, F.R.S., &c., PRESIDENT.

[*ABSTRACT.*]

PROF. WILLIAMSON commenced by stating, that he had been under the impression that the address he was about to deliver was to be given before the members of the Yorkshire Union only, and he had so prepared it as to be adapted for scientific students, and not for a popular assembly. He was therefore afraid that some of his audience might find it rather dry. It had been mentioned that both himself and Dr. Sorby were Fellows of the Royal Society, but it was very possible that some of his hearers, before he had finished, might feel disposed to translate those letters, F.R.S., in a sense certainly not very flattering, viz., "fellows remarkably stupid," as he had once or twice before heard them interpreted.

He wished to speak that evening on the differences between the older methods of studying botanical science, and those which now prevail among modern botanists. Prior to the time of the immortal Linnæus, there existed—contrary to the popular opinion—a great variety of botanical literature. From the time of Theophrastus (about 300 years B.C.) to that of Linnæus, there were hundreds of treatises written, the names of the authors of which are mostly forgotten. Yet most gardeners are really familiar with their names, though they do not often know it, as they have been preserved in the names of many plants called after them, such as *Lobelia*, *Calceolaria*, *Matthiola*, and so forth. These writers were, however, mostly interested in discovering and naming new species and genera. The naming of known plants, and the discovering of new ones, occupied their whole time and writings. Chemistry and other cognate sciences were then scarcely even in their infancy, and were very imperfect; consequently the earlier botanists did not, and could not, enter into any physiological problems. Only two names can be given as attempting anything in this direction; these were Malpighi, an Italian, and Grew, our own countryman. They laid the foundations of modern botany by directing their attention to the functions and morphology of plants. After naming and discovering plants, many

of the earlier botanists proceeded to study the medical properties of plants. This was very easily done. Men knowing themselves to be afflicted by various diseases and accidents, naturally looked around them amongst the vegetable kingdom for remedies. This is even yet the case amongst savage nations. Another aspect of the subject to which attention was directed was the economical one—to what practical every-day use plants could be employed. In regard to all these aspects the earliest botanists were guilty of the greatest mistakes, particularly with regard to the functions of plants. They advanced speculations and theories innumerable, but altogether ignored facts; and possibly not one in ten thousand of their theories is of the slightest use or value to us from a scientific point of view.

Linnaeus introduced many and great reforms into the study of botany; but even before him two other men, had made a few important advances. Among the Egyptians there was some knowledge of the sexes of plants, and they learned the way to produce perfect seed in certain plants by introducing the pollen of the male flower into the pistil of the female; but it is not at all likely they knew anything of the theoretical reasons for their so doing. Millington and another re-discovered something of the sexuality of plants, by finding that the functions of the pollen and the ovary were different. Lobel also discovered that onion and grass, and some other seeds, when sowed, came up with only one seed-leaf, or cotyledon, while on the other hand the radish, the oak, and some other plants always produced two seed-leaves. These and others were preparing the way for Linnaeus.

He wrote that the characteristic of a botanist of those days was, that that man was the best botanist who knew the names of the greatest number of species. Linnaeus first adopted and introduced what we now call the binomial system of nomenclature—by which system all plants which possess certain characteristics in common are united into one genus, under one name, and their specific distinctions are denoted by another name added to it. (The Professor gave a number of instances illustrative of this method.) The re-discovery of the sexuality of plants was made use of by Linnaeus as a means of classification. The two Jussieus did great service to botanical science, and the younger of them introduced a new system of classification. That of Linnaeus was an artificial one, as he himself well knew, and brought together many plants that are undoubtedly allied, and many others also which have no natural alliance whatever; but he also left a sketch of a more

natural system, which, however, was very imperfect. Then came the younger Jussieu, who laid hold of Lobel's discovery, and on it based the two grand classes of flowering plants, the Dicotyledons and the Monocotyledons, or those having two and one seed-leaf respectively. Desfontaine next discovered the connection between the dicotyledonous mode of germination and the exogenous method of stem growth. (The Professor here enlarged considerably upon this connection, adducing various examples.) The next great discovery was partly morphological and partly physiological, and was made by a man from whom we should scarcely have expected it *a priori*. But Goethe had the spirit of a scientific philosopher, and he showed that the flower is morphologically a leaf-bud, and that every part of every flower is merely a modification of an ordinary leaf. Gardeners know how easy it is in many cases to cause a plant to be so prolific in flowers that the ordinary foliage is almost hidden. The reason of this is, that the ordinary buds are converted into flowers.

Another discovery was now made. When a flower is young, its component parts are regular, all the whorls having frequently the same number of parts and being symmetrically arranged. But De Candolle showed that by the suppression of certain parts, the cohesion of parts, and the increased development of others, we have irregular flowers, like the pea and the snapdragon, developed from regular ones; and Dr. Robert Brown deserves and receives the highest praise for his investigations into the development of the flowers of orchids, which was especially a brilliant achievement by a man the whole of whose work was well done.

The Professor then passed on to the consideration of the Cryptogams, or so-called flowerless plants. Linnæus found many plants in which he could discover no trace of a flower, such as ferns, mosses, &c., but he very wisely called them cryptogamic, and not agamic—flowers hidden, not flowers absent. Up to 1840 men sought in vain for the reproductive organs of the cryptogams, simply because they looked in the wrong place. To Nagel is due the honour of having first discovered it among ferns. The first growth from a fern spore is a small dark-green cellular film, about the size of one's finger nail, which we call the prothallium, and this bears the organs which correspond to the stamens and pistils of flowering plants. Nagel discovered the antheridia, or male organ, in 1844, and a Polish Count the archegonia, or female, in 1848. Since then, a host of observers have made one discovery after another, until this department of botanical science has been brought into its present state.

Mettenius soon discovered the sexual organs in lycopods, and in 1849 Hofmeister did the same for the *Rhizocarpæ*, and also in 1855 in the *equisetums*. To him also is due the discovery of the relation between the reproductive structures of the cryptogams and those of the higher flowering plants. Thus he showed that the embryo sac of a phanerogam was the analogue and representative of the prothallus of a fern.

At the present day the great majority of modern botanists are devoting themselves to the study of the laws of vegetable life, the mode of development, and the chemical processes that go on within the plant. The collection of species is a valuable aid in another department—the geographical distribution of plants, hence Prof. Williamson recommended the naturalist not to neglect the collecting and recording of species, and shewed how that all may, in one way or another, aid the grand work of obtaining a complete knowledge of plants. The great question of the present hour is that of evolution: and in considering it for a few moments, he paid a very high and deserved compliment to the splendid researches and deductions of Mr. Darwin—which even those who do not agree with his conclusions must also endorse—for the grandeur of his work, which must mark an epoch in biological science.

ON THE ORGANISATION OF THE FOSSIL PLANTS OF THE COAL MEASURES.

BY THOS. HICK, B.A., B. Sc.

PROF. WILLIAMSON'S TENTH MEMOIR on this subject has just been printed from the Transactions of the Royal Society, and is well deserving of close study on the part of both botanists and palæontologists. It is not wanting either in the interest or importance which have characterised the preceding memoirs, but is perhaps chiefly valuable for the complete settlement which it affords of some questions which have hitherto been held in dispute.

In the first place, the Professor takes up the consideration of the remains of carboniferous plants met with in certain thin shales, imbedded in volcanic ash, which were discovered in 1865 at Laggan Bay, in Arran. These remains were found in the position in which they originally grew, and consist for the most part of thin cylinders of vegetable tissue, which originally formed the outer bark of the stems of trees. The interior of these cylinders "was in most cases filled with

volcanic ash, but in a few instances by vegetable *débris* introduced from without ; and in one specimen, imbedded in the vegetable mass, are several diploxyloid axes, of very old stems." By some authorities these axes have been regarded as young growths that sprang up within the cylinders of bark after the inner tissues of the stems had been destroyed ; but Prof. Williamson is of opinion that this is an error, their magnitude and decorticated condition, as well as the nature of the materials with which they are intermixed, pointing rather to the conclusion that they have been introduced from without. A question of primary importance was the botanical character of these stems, as indicated by the remains of their bark, and by the nature of the numerous fragments of twigs, branches and fruits in the overlying beds ; and the course of the investigations which Prof. Williamson undertook was shaped with a view to its solution. The results, which are here given with the most ample details, show unmistakably that the stems in question are all lepidodendroid in nature, and that they present none of the characters that should be met with had their affinities been rather with the *Sigillariæ*. It is true that the surface is marked longitudinally by a number of fissures which at first sight suggest a comparison with those of *Sigillariæ*, but on closer examination they are found to be of mechanical rather than of organic origin, while, as we have said, the characteristic structure of *Sigillariæ* is altogether absent. On the other hand, the composition and arrangement of the tissues of the stems, so far as they are preserved : the structure of the leaves ; and the form and arrangement of the leaf-scars, are all of the lepidodendroid kind, so that there is both negative and positive evidence of the strongest kind in support of the conclusion arrived at.

The general nature of the specimens being thus determined, the author proceeds to a detailed description of their structure as exhibited in thin sections prepared for microscopical examination. The description is drawn up in excellent style, and is accompanied by well-executed illustrative figures, as in the previous memoirs. Both the descriptions and the figures bear out the interpretations put upon the specimens in the previous paragraphs, and incidentally throw light on the somewhat vexed question, the affinities of the *Sigillariæ*. As is well known to those who keep themselves *au courant* with these investigations, MM. Brongniart and Renault, the eminent French palæo-botanists, are of opinion that while the *Lepidodendra* are undoubtedly cryptogams closely allied to existing Lycopods, the *Sigillariæ* belong to a higher order of vegetable life, and are to be ranked as exogenous

Gymnosperms. Prof. Williamson is altogether opposed to this view, believing the *Sigillariæ* to be no less cryptogamic than the *Lepidodendra*, and we believe the next part of his "Memoirs" will be largely occupied with a demonstration of the truth of his conclusions based upon a careful comparison of a somewhat large series of specimens. In the descriptions under notice, however, there is sufficient evidence to warrant a strong presumption that on this point Prof. Williamson is in the right, inasmuch as they show that although the Arran plants are of lepidodendroid affinities, they yet possess the "cylindre ligneux," or, as Prof. Williamson terms it, the "exogenous zone," which, in the opinion of the French *savants*, is characteristic of fossil gymnosperms. The evidence derived from the fossil fruits met with in company with these stems, points likewise to their lepidodendroid nature. These are all true *Lepidostrobi*, though of probably distinct species, containing both macrospores and microspores, some of which, in one or two instances, are preserved.

The Arran plants disposed of, the author next adverts to the stem of *Ulodendron*, and certain spores and conceptacles described in his previous memoirs, on which additional light has been thrown by the examination of further specimens. He also gives descriptions of two new fern stems, supplied by Messrs. Binns and Spencer, of Halifax, of whose industry and patience in unearthing fossil plants and preparing them for microscopic investigation it is impossible to speak too highly. In this connection he returns to the discussion on the nature of *Traquariæ*, on which there has been considerable difference of opinion between him and some other naturalists. Thus, Mr. Carruthers, who early called attention to the objects so-called, came to the conclusion that they were animal in their nature, and were, in fact, carboniferous *Radiolarians*. Prof. Williamson, on the other hand, has for some years maintained their vegetable origin, and has lost no opportunity of becoming further acquainted with them, in the hope of obtaining decisive evidence of their character. This he appears to have now done, and the elaborate descriptions here given of the more characteristic individual specimens will leave little doubt in the mind of the student that their supposed animal origin is disposed of for ever. It may be added that he is supported in his opinion of their vegetable origin by Professors Haeckel and Strasburger, of Jena, the latter of whom, adopting Prof. Williamson's diagnosis that they are cryptogamic macrospores, suggests that their nearest allies will possibly be found in those of *Azolla* and other *Rhizocarpous* genera.

Passing from these objects, the author devotes a few paragraphs to

the bodies known as Zygosporites, and the reported, but as yet unconfirmed, presence of diatoms in coal; and concludes with an account of a group of peculiar structures whose nature has not yet been satisfactorily determined, but which are here described under the provisional name of *Calcisphæra*.

Harrogate, Dec., 1880.

COLEOPTERA OF LIVERPOOL AND NEIGHBOURHOOD.

(Continued.)

BY JOHN W. ELLIS, L.R.S.C.E.

CARABIDÆ—continued.

PELOPHILA.

P. borealis, Pk. Two specimens from Bromborough I refer to this species, C S G.

LEISTUS.

L. spinibarbis, F. Eastham Wood, C S G. I have only seen it in the fir plantations at Storeton, where Mr. Smedley and myself have taken it abundantly under small stones, in spring. One specimen from Flaybrick Hill—J. R. L. Dixon.

L. fulvibarbis, D. Jackson's Wood, Claughton: Birch Wood, Woolton, C S G. Very abundant in Eastham Wood; I once saw at least fifty specimens on turning over a log of timber which had lain there for some time.

L. ferrugineus, L. and *L. rufescens*, F. Both these species are common among dead leaves at Eastham and Prenton, J W E and J H S; Crosby sandhills, C S G and F K. Mr. Curzon has taken both species on the shore at Crigburth.

CLIVINA.

C. fossor, L. Banks of Alt, Dey's Brook, and Birket, C S G; Roby and West Derby, J W E and J H S. I used to take it freely in the brickfields behind Wavertree Park, under stones.

C. collaris, Hbst. With the former, C S G.

DYSCHIRIUS.

D. thoracicus, Ross. Wallasey sandhills, July, J W E; E R Curzon.

D. obscurus, Gyll. (*thoracicus*, Fab). The commonest of the genus with us—on the sandhills, C S G.

D. impunctipennis, Daws. Crosby shore, April and May, C S G.

D. nitidus, Dj. Sandhills, Crosby, June, C S G; Wallasey, J W E.

D. politus, Dj. Wallasey sandhills, June—twice met with freely, C S G: I have a single specimen from Wallasey, J W E.

D. salinus, Schaum. Banks of streams on the shore between Waterloo and Crosby, May, C S G.

D. globosus. Hbst. Plentiful near Little Brighton, Crosby, May, C S G: a single specimen from Wallasey, J W E.

DEMETRIAS.

D. atricapillus, L. Abundant on the sandhills: also in profusion on the mugwort (*Artemisia campestris*) in autumn.

D. monostigma, Leach (*unipunctatus*, Germ.) Wallasey sandhills, with *atricapillus*, C S G.

DROMIUS.

D. linearis, Oliv. On the sandhills among dead leaves, &c., and with *D atricapillus* on mugwort.

D. agilis, F. Under the bark of willows, C S G; under bark between Waterloo and Crosby, F K.

D. meridionalis, Dj. Two specimens beaten from firs at Bidston, J W E; with the preceding species, F K.

D. quadrimaculatus, L. Under bark of willows, C S G: two from under the bark of an oak, Eastham Wood, J W E.

D. quadrisignatus, D. Under bark of willows in the Upton valley, C S G; one specimen last September, beaten from birch, Bidston, J W E.

D. melanocephalus, D. Common among dead sallow leaves on the sandhills.

BLECHRUS.

B. manius, Sturm. On the sandhills, C S G. I have taken the variety *glabratus* abundantly on a fine summer's day at the far end of Wallasey Pool, but very difficult to capture.

METABLETUS.

M. foveola, Gyll. Common on the sandhills among dead sallow leaves.

LEBIA.

L. chlorocephala, E. H. Banks of the Alt, at Sefton, C S G.

LORICERA.

L. pilicornis, F. Very abundant under stones, among moss, &c.

CHLÆNIUS.

C. nigricornis, F. Banks of Birket, and Knowsley Quarry, April and May, C S G.

BADISTER.

B. bipustulatus, F. Prenton Wood, Storeton Quarry, Huyton Quarry, C S G; roadside between New Ferry and Bromborough, J W E and J H S; Seaforth, F K.

BROSCHUS.

- B. cephalotes*, L. Common on the shore under driftwood and peat, where it often forms a burrow.

SPHODRUS.

- S. leucophthalmus*, L. Two in the neighbourhood of St. John's Market, Liverpool, C S G; three in a kitchen, Price-street, Birkenhead, about a year since, J H S.

PRISTONYCHUS.

- P. subcyrneus*, M. (*terricola*, Hbst.) Common in cellars. I have also taken it on Crigburth shore, beneath dead animals.

CALATHUS.

- C. cistiloides*, Px. Very common about dry heathy lands, and on the sandhills.

- C. flavipes* and *C. mollis*, Marsh. Both species very abundant on the sandhills.

- C. fuscus*, F. Two from Patrick Wood, C S G.

- C. melanocephalus*, L. Abundant everywhere.

- C. piceus*, Marsh. Eastham Wood, tolerably common.

TAPHRIA.

- T. nivalis*, Pz. Banks of Alt, Hightown, occasionally, C S G.

ANCHOMENUS.

- A. junceus*, Scop. Common in marshy land; comes freely to sugar, C S G.

- A. prasinus*, Thunb. (*dorsalis*, Daws.) As abundant as it is beautiful.

- A. albipes*, Fab. Abundant in wet places.

- A. marginatus*, L. This beautiful species seems to be tolerably common. Behind Wavertree Park, Wallasey sandhills, Leasowe, Crigburth shore, &c., &c., always in damp places.

- A. ericeti*, Pz. On the mosses, scarce; one specimen from Claughton, C S G. I have one, most probably from one of the mosses given me by Mr. Johnson.

- A. parumpunctatus*, F. Very abundant and variable.

- A. viduus*, Pz., and var. *mæstus*, Duft. Common, C S G. One near Westminster-road, F K.

- A. atratus*, Duft. Two specimens in my collection—one from Leasowe, and one from West Derby, J W E; Seaforth, F K.

- A. piceus*, F. Eastham and Hooton, scarce, C S G.

- A. fuliginosus*, Pz. Eastham, Hooton, and Raby Mere, C S G.

- A. puellus*, D. (*pelidnus*, Pk.) One specimen by shaking bundles of dried reeds on Kidston Marsh, Nov. (F. Archer, in scrap-book.)

OLISTHOPUS.

O. rotundatus, Pk. About half-a-dozen specimens adjoining Bidston and Flaybrick Hills, J W E ; Storeton, C S G.

STOMIS.

S. pumicatus, Pz. Scarce on the banks of the Alt, June, C S J. I have taken it freely on the roadside between New Ferry and Bromborough ; also a few specimens at Childwall, J W E ; two at Club Moor, J. R. L. Dixon ; one near Stanley-road, F K.

PTEROSTICHUS.

P. cupreus, L. Under stones at the mouth of brooks where they join the salt water, C S G ; a very fine specimen on the railway bank between Waterloo and Crosby, F K.

P. vernalis, L. Common under stones, &c.

P. vulgaris, L. (*melanarius*, Hb.) Abundant.

P. niger. Schall. Abundant.

P. anthracinus, Hb. Under *rejectamenta*, on the banks of the Alt near Hightown, C S G.

P. nigrita, F. Common in damp places.

P. minor, Gyll. Common, C S G.

P. strenuus, Pz. (*erythropus*, Daw.) Common.

P. vitreus, D. (*orinomus*, Steph.) Raby Mere and Sutton, in spring, C S G.

P. madidus, F. Abundant.

P. parumpunctatus, Germ. Around Bidston, C S J.

P. striola, F. Common under rubbish, &c. Easily recognised by its having the thorax as wide at the base as the elytra.

AMARA.

A. fulva, De G. Common under stones on the shore.

A. apricaria, Pk. Very common about the sandhills, often inland.

(To be continued.)

Short Notes and Queries.

STRANGE FLIGHT OF OWLS. —The following appears in the *Ripon Gazette* for 13th Jan. :—"A flight of owls, upwards of 20, may be seen daily in a field of Mr. Dighton's, of Kirklington, near Ripon. The field contains a large quantity of thick grass, and here they take up their abode in the daytime."—W. GREGSON, Baldersley, Thirsk.

SNOW BUNTINGS AT HUDDERSFIELD. —I have had three specimens of the snow bunting brought in, just shot out of a flock of about twenty, at Dalton.—JAMES VARLEY, Huddersfield.

NOTICES OF BOOKS, &c.—“London Catalogue of British Mosses and Hepatics. 2nd ed., Lond., David Bogue.”—We have received copies of the 2nd edition of the above Catalogue, which is issued under the direction of the Botanical Record Club. This is a great improvement on the first edition, and has clearly been carefully revised and edited; whilst the addition of the Hepatics is a much-needed and welcome feature. The census numbers shewing the distribution of each species through the 18 Watsonian provinces of Great Britain are a further addition to the original catalogue. These will be found very useful to the student of distribution, as although confessedly to a certain extent imperfect—as indeed at present they must be—they will at least indicate what are the desiderata for completing the census, and will also enable collectors to ascertain when they have discovered an unrecorded species. The number of species given is exactly the same as in the first edition, but they are not altogether the same, as several additions have been made, which are, however, exactly balanced by the elision of doubtful or erroneous records. These are indicated in a separate list at the end of the Catalogue. Altogether, we must congratulate the Club on the neat manner in which the list has appeared, as well as upon the contents. Copies printed on one side only can be obtained at a slightly advanced price. We regret that the space at our disposal this month will not permit our entering upon the details of the alterations in the moss-list, but this is of little importance, as every moss-collector must have a copy or two, and can thus see for himself.

Rainfall for December.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1880.	1879.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4.06	...	38.92	* 33.17	22	.90
HALIFAX...(F. G. S. Rawson)	360	6.67	19	48.77	42.10	...	...
BARNSEY ... (T. Lister) ...	350	3.45	21	38.64	28.05	29	.97
INGBIRCHWORTH (do.)	853	5.08	26	48.94	37.83	22	1.06
WENTWORTH CASTLE (do.)...	520	3.64	17	38.60	30.86	29	1.10
GOOLE ... (J. HARRISON) ...	25	2.53	16	32.17	23.29	29	.63

* This is the average to date for 14 years, 1866-79.

Reports of Societies.

BARNSEY NATURALISTS' SOCIETY.—Annual meeting, 4th January.—The accounts prepared by Mr. W. Barraclough, financial sec., were read, showing a satisfactory balance. Mr. W. E. Brady, sec. of the entomological section, read a brief report of the season's labours in excursions

and meetings. Several interesting species were recorded. Mr. T. Lister, in resigning the office of president, which he had held from the infancy of the society, gave a very brief glance at the work accomplished and the progress made, urging to continued efforts in promoting the success of the society. He alluded to the excursions carried out last year by the Yorkshire Naturalist Union, one of which included the Dearne valley, Wentworth Castle, Canon Hall, &c, and strongly recommended that the excursions and meetings should receive the increased support of members and friends of societies. The election of officers was then made as follows:—President, Mr. A. Kell; corresponding secretary, Mr. C. Bellamy; financial secretary, Mr. W. Barraclough (the two last-named being re-elected). A few occurrences of birds have been noted. A late stay of the night-jar, or goatsucker, is confirmed about the end of October; three specimens were observed, unfortunately shot, also several of those useful vermin-killers, the white and long-eared owls. A white sparrow, a black bullfinch (just dead), and a pied blackbird were seen at Stainborough Jan. 14th; a great spotted woodpecker recorded by Mr. E. Hailstone at Walton, and widgeons still there. Fieldfares, redwings, snow buntings, wood pigeons, bullfinches, carrion crows, kestrels, and a few sparrow hawks are recorded by many observers.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 18th.—The president (Mr. W. West) delivered his opening address. At the outset he spoke of the distribution of butterflies, after which he thoroughly described the nature of fungi, and referred to the animal nature of the myxomycetes. In speaking of lichens he treated of their structure, and showed the similarity existing between the fruit of these plants and ascomycetous fungi. He then stated that lichens were no longer considered as a separate class of plants by leading mycologists, but they were in reality ascomycetous fungi, parasitic on algæ. The address was illustrated by sketches on the blackboard, and by a number of interesting slides under the microscope.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting 15th Jan., Mr. J. Varley in the chair.—Mr. S. L. Mosley exhibited some fine specimens of exotic moths and butterflies, including *Mania raphæus*, Madagascar: this is universally acknowledged as being the finest butterfly in the world: *Atticus luna*, North America; *A. cynthea*, China; *Danias chrysippus*, European; *Grapta interrogationis*, North America; *Paphilio Hector*, Asiatic; *Danias lemnæa*, Asiatic Islands; *Delias lacharis*, India; *Diadema boliva*, India; *Papilio dimoleus*, Africa. The above will be seen to comprise some very rare specimens, and are a splendid assortment of insects. In the course of some observations Mr. Mosley remarked that there was difficulty in ascertaining the fact whether some of the insects are butterflies or moths, and stated that this difficulty arises from our having no larvæ of the exotic insects, only the perfect insect itself exhibited. The chairman exhibited a pair of snow buntings, shot at

Dalton last week. Mr. Mosley here pointed out the difference between the old and young bird, the mature being much whiter than this season's bird. He also gave some very interesting facts as to the wearing of the feathers, in relation to the change it causes in the appearance and colour of the bird. Mr. Varley remarked that he had observed a great diminution of the small birds in this locality, his opinion being that it was the result of the last two inclement winters.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, 15th January, Mr. James Spencer in the chair.—An hour was pleasantly spent in examining some geological specimens which were shown by the president, viz., a sporangium containing *Zygosporites brevites*. These pretty spores, which are plentiful in our coal-balls, bear a striking resemblance to the fossil *Xanthidia* of the flint nodules which occur in the chalk rocks. Prof. Williamson, who has examined and named them, was doubtful whether they belonged to the Desmidiæ or were spores of some unknown form of lepidodendroid plant; though, from the fact that no undoubted desmids have yet been discovered in the coal measures, he inclined to the latter opinion. Mr. Spencer's new discovery helps to confirm the Professor's surmise, by placing *Zygosporites* among the lepidodendroid spores. This is the first time, so far as Mr. Spencer is aware, that these pretty little spores have been found enclosed in a sporangium.—JOSEPH OGDEN, Sec.

WAKEFIELD NATURALISTS' AND PHILOSOPHICAL SOCIETY.—Tenth annual meeting, Jan. 5th, the president, J. Wainwright, Esq., F.L.S., in the chair.—There were no exhibits. A favourable report of the proceedings during the past year, with a balance-sheet, was read by the secretary, and passed. Ballot papers were then given to each member, containing the names of a number of gentlemen, and the various officers were elected, including Mr. Joseph Wainwright, president (re-elected), and Mr. Edwd. B. Wigglesworth, hon. sec. The president then read a paper on "The Peculiarities of Plant Life" (colour), in the course of which he endeavoured to point out how all the varied colours of flowers were supposed to have been caused, in illustration of which many known flowers were alluded to.—E. B. W.

YORKSHIRE NATURALISTS' UNION.—ANNUAL MEETING.—The 19th annual meeting was held at the Victoria Hall, Goodramgate, York, on the 15th January. The Sections held their meetings at 3-45 p.m., and elected their officers as follows:—Rev. H. H. Slater, B.A., F.Z.S., Ripon, president, and Mr. W. Eagle Clarke, M.B.O.U., Leeds, secretary, of the Vertebrate Section; Mr. W. Cash, F.G.S., Halifax, president, and Mr. J. Darker Butterell, Beverley, secretary, of the Conchological Section; Mr. W. Prest, York, president, and Mr. E. B. Wigglesworth, Wakefield, secretary, of the Entomological Section; Mr. C. P. Hobkirk, F.L.S., Huddersfield, president, and Messrs. Wm. West, Bradford, and F. Arnold Lees, F.L.S., Wetherby, secretaries, of the Botanical Section;

and Prof. A. H. Green, M.A., F.G.S., Leeds, president, and Mr. B. Holgate, Leeds, secretary, of the Geological Section. Tea was served at 4-30 p.m., and at 5-30 p.m. The annual general meeting was commenced at 6-30 p.m., the chair being taken by Prof. W. C. Williamson, F.R.S., of the Owen's College, Manchester. The minutes of the previous annual meeting were taken as read. The list of new subscribers, to whom thanks were voted, included Lord Herries, Lord-Lieutenant of the East Riding, Dr. A. K. Rollitt, F.R.A.S., of Hull, the Rev. Joseph Foxley and Mr. J. Proudcock, of Market Weighton; Messrs. W. Brook, T. Bunker, and J. Harrison, of Goole; John Harrison of Wilstrop, Wm. Atkinson of Leeds, Wm. Foggitt of Thirsk, J. Ingleby of Eavestone, J. H. Wilson of Harrogate, Wm. Hewett of York, and Edwd. Hailstone, F.S.A., of Walton Hall. Thanks were voted for donations to the library, including various societies' publications sent in exchange. The annual report and balance sheet were read by Mr. Geo. Brook, ter., F.L.S., secretary, as follows:—

“The Council, in presenting the 19th annual report, have to congratulate the members on the steady continuance of the progress which has marked the history of the Union since its re-organisation. The reports of the various sections will show what progress has been made in the direction of the investigation of the Natural History of the county. During the year six excursion meetings have been held as follows:—Ripon, March 29; Malton, May 16; Barnsley, June 12; Boston Spa, July 14; Marsden, Aug. 2; Market Weighton, Sept. 4. It had been intended to have in the autumn a special meeting for the collection and study of fungi, at which a number of the best British mycologists would have been present and assisted the Union with their special knowledge and experience, but reasons of a financial nature compelled its postponement to a future year. A gratifying result of the second meeting—the one held at Malton—was the subsequent formation of a strong Naturalists' Club in the town, the direct outcome of the impression produced by the visit of the Union. The club—now associated with us—numbers sixty members. When the year commenced there were in the Union 26 societies. None have withdrawn; and on the other hand, two—the Malton Naturalists' Club, 60 members, to which reference has just been made; and the Hull Field Naturalists' Society, 23 members—have joined during the year. These additions bring up the total number to 28, of which one is in the North Riding, two in the East, and the remainder in the West Riding. The statistics which have been furnished to the Union by the secretaries of the different societies show that the individual membership is in the aggregate 1,422. Adding to this figure the 250 subscribers, it will be seen that the Union now consists of 1,672, an increase of 169 upon the previous year. The draft of the proposed map has been at a total standstill during the year. The loss of Dr. Parsons has been here very keenly felt, and the map committee would be glad to meet with some competent geologist who would take up the mapping out of the lithology at the point where Dr. Parsons left it. Mr. Filliter, of Leeds, to whom the Union is much indebted for having gratuitously traced the contour-lines for the greater portion of the county, has also been compelled—by the exigencies of a large and increasing practice—to resign into the hands of the committee the work so far as he has been able to do

it. It will therefore be incumbent on the committee to make provision for the completion of this portion of the work. The publication of the Union's Transactions having led to an exchange with societies of similar aims, the library has been increased by the addition of such publications as are issued by the societies in question. Various presentations have also been made by members of the Union. The secretaries will be prepared to lend books or pamphlets belonging to the Union to such societies or subscribers as may wish for the loan. The number of subscribers has increased from 221 to 265. At the last annual meeting a series of resolutions was passed, whereby a new class of members was created—that of honorary life members. The regulations governing their selection provide that the total number shall be limited to twenty, and that no more than two be elected annually; that their proposers shall be required to show a double qualification—first, acknowledged scientific attainments, and secondly, signal services rendered to the Union; and that such members shall have all the privileges and rights of ordinary members and subscribers. It is also provided that every successful candidate shall have a clear majority of three-fourths of the votes, first of the council, and then of an annual or specially convened general meeting. Dr. Parsons, late of Goole, whose services and co-operation were of such inestimable value to the Union, and the loss of whom is still keenly felt, was unanimously elected as the first of these members. On the occasion of the twenty-first anniversary of the publication of the "Origin of Species," it was arranged to congratulate Mr. Darwin, the author, upon so interesting an event. It was accordingly decided to prepare an address, and, when suitably engrossed, that a small deputation should present it to Mr. Darwin personally at his residence. This was accordingly done on the 3rd of November. The cost of engrossing in book form, and of a number of reprints of it, was borne by voluntary subscription among the members. Mr. Thomas Lister was appointed to represent the Union at the Swansea meeting of the British Association, and when there, assisted at a conference of delegates of provincial scientific societies, when it was arranged that a more representative conference should be held in York next August, to consider in what manner best to promote the interests of the various societies represented. The president and secretary of the Union are, by the rules of the British Association, entitled to sit on its general committee, either personally or by delegates. The present year being that of the celebration of the jubilee of the Association, when it will again meet in the city of its nativity, your Council hope that members will do their best to secure the complete success of what is a memorable and ought to be a brilliant event in the history both of the Association and of the county of York. In concluding their report, your Council congratulate the members on the good fortune which the Union had had in securing the services, as presidents, of Yorkshiremen who have made their mark in the field of scientific discovery."

The report and balance-sheet having been adopted on the motion of Mr. Thos. Hick, B.A., B.Sc., seconded by Mr. B. Holgate, F.G.S., the excursion programme for 1881 was resolved upon, as follows:—Skipton, Easter Monday, April 18th; Sheffield, for the Rivelin Valley, Saturday, May 14th; Hornsea or Flamborough Head, Whit Monday, June 6th; Thorne Waste, Saturday, July 9th; Richmond, Bank Holiday, Monday, Aug. 1st; and a fungus meeting at Leeds about the end of September or beginning of October; the annual meeting to be held at Bradford on the

first Saturday in March, 1882. It was also decided, on the recommendation of the Council, that the circulars for the first five excursions be limited to a single page. The officers for 1881 were then elected, Prof. Williamson being again chosen as president, on the motion of Dr. H. C. Sorby, F.R.S. Mr. W. Denison Roebuck, Leeds, was re-elected as secretary, and, Mr. Brook retiring from office, Mr. W. Eagle Clarke, M.B.O.U., Leeds, was elected to the second secretaryship. The auditors (Messrs. A. Crebbin of Bradford, and C. W. Richardson of Wakefield) were re-elected. A vote of thanks to Mr. Prest for acting as local secretary, and another to the various officers of the Union for their services during the year, were passed. Seventeen societies were represented at the meeting, and eleven entirely absent. After an adjournment, the presidential address was delivered * in the large hall at seven o'clock, the chair being occupied by the Lord Mayor of York (Mr. J. S. Rowntree) who was accompanied on the platform by the City Sheriff (Mr. R. Thompson), Dr. Sorby, Mr. Ald. Terry, president of the York Society, and other gentlemen. A vote of thanks to the president was proposed by Dr. Sorby, seconded by Mr. Thos. Hick, B.A., B.Sc., and supported by the Sheriff, and carried; also one to the Lord Mayor for presiding. The company then proceeded to the enjoyment of a *conversazione* and microscopical soiree, which had been provided by the York and District Field Naturalists' Society, and which passed off very successfully. The hall had been fitted up with tables, on which were tastefully displayed the principal treasures of the above society, and also several valuable contributions from members of other societies in the Union. Amongst the local contributions there was a large collection of British grasses, by Mr. Bewlay of York: a capital exhibition of lepidoptera and coleoptera, principally shown by Mr. Prest, the secretary, and by Mr. Jackson, York: a valuable assortment of British and foreign ferns and other plants, collected and mounted by Mr. J. H. Carr, York. Amongst other curiosities were also a collection of shells and petrifications from Knaresborough, and a beautiful series of drawings by Dr. Sorby, of Sheffield, made during the cruise of his yacht the *Glimpse*, from May to October last year. The drawings had special reference to meteorology, and to climatic and meteoric changes. But valuable and interesting as these exhibits were, the microscopes formed the chief centre of interest. Of these there was a grand display, some most valuable ones having been contributed for the occasion by Mr. Farmer (late Cook and Sons), Coney-street, and Mr. R. Smith, High Ousegate. Dr. Tempest Anderson, York, Messrs. C. P. Hobkirk, F.L.S., and G. Brook, F.L.S., of Huddersfield, Thomas Hick, B.A., Harrogate, T. Birks and J. Harrison, Goole, Washington Teasdale, Leeds, and other gentlemen connected with the Union, also contributed to this department of the soiree. The chief of the objects shown by the microscopes had special reference to botany, and were designed to illustrate the presidential address.—W. D. R.

* See page 97.

Diary.—Meetings of Societies.

- February 1. Liversedge Naturalists' Society.
 „ 1. Bishop Auckland Naturalists' Field Club.
 „ 1. Bradford Naturalists' Society.—“Addition to Local List of Lepidoptera,” Mr. J. W. Carter.
 „ 1. Barnsley Naturalists' Society.
 „ 2. Wakefield Naturalists' Society.—“Walton Hall, past and present,” Mr. Thomas Lister, of Barnsley, 7-45 p.m.
 „ 2. Entomological Society of London, 8 p.m.
 „ 3. Linnean Society of London, 8 p.m.
 „ 9. York and District Naturalists' Field Club.
 „ 11. Dewsbury Naturalists' Society.
 „ 15. Bradford Naturalists' Society.—Paper by Mr. J. N. Lee
 „ 15. Barnsley Naturalists' Society.
 „ 16. Wakefield Naturalists' Society.—“Fertilization of the Orchids,” Mr. J. Spurling.
 „ 17. North Staffordshire Naturalists' Field Club.—Meeting at Leek, Local Secretary, Wm. Brough.
 „ 17. Linnean Society of London.
 „ 21. Manchester Cryptogamic Society.
 „ 28. Lancashire and Cheshire Entomological Society.

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PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' “Moss-Flora of the East-Riding”; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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Original Articles.

COLEOPTERA OF LIVERPOOL AND NEIGHBOURHOOD.

(Concluded.)

BY JOHN W. ELLIS, L.R.S.C.E.

AMARA—continued.

- A. spinipes*, L. Sefton, C S G. Two by nocturnal sweeping in Ullet-road, J W E; one from Club Moor, J. R. L. Dixon. Mr. Kinder informs me that he has taken this species commonly in the heads of thistles, about the end of Westminster-road.
- A. bifrons*, Gyll. Abundant in August, 1879, in the roots of wild chamomile in the Canada Dock station; also on the flowers at night, F K.
- A. lucida*, Duft. Frequent on the Crosby sandhills, spring.
- A. tibialis*, Pk. Wallasey and Crosby sandhills, common.
- A. familiaris*, Duft. Abundant.
- A. acuminata*, Pk. Wallasey Pool, not common, C S G.
- A. trivialis*, Gyll. Common.
- A. spreta*, D. Two specimens, among other *Amaræ*, C S G.
- A. curta*, D. A pair taken at West Kirby, C S G.
- A. communis*, Pz. Abundant.
- A. ovata*, F. (*obsoleta*, D.; *pratensis*, Stev.) Wallasey Pool, plentiful, C S G; one in Wavertree-road, J H S; a few in fields near Stanley-road, F K.
- A. similata*, Gyll. Wallasey Pool, C S G; Otterspool, and the Wallasey sandhills, J W E; Seaforth, F K.
- A. plebeia*, Gyll. About a dozen, near the shore at Seaforth, F K.

DICHIOTRICHUS.

- D. pubescens*, Pk. This very variable species is abundant among drift at Bromborough Pool, also on the Aigburth shore and banks of Birket.

ANISODACTYLUS.

- A. binotatus*, F. Wallasey Pool, under stones, C S G.
- A. pæciloides*, Steph. I have had the pleasure of adding this beautiful species to our list—one specimen on the shore at New Ferry, and another (immature) among *Harpalus proteus* at Flaybrick Hill.

HARPALUS.

- H. azureus*, F. Wallasey Pool, under stones, C S G.
- H. ruficornis*, F. Abundant.

- H. proteus*, Pk. (*æneus*, F.) Very abundant, and very variable in color.
H. puncticollis, Pk. One specimen on the sandhills, Hightown, F K.
H. ignavus, Duft. (*honestus*, Daws.) One specimen on Flaybrick Hill.
 The same day I took *A. pæciloides*; Sept., 1879, J W E.
H. cupreus, Steph. Three specimens, Wallasey Pool, C S G.
H. rubripes, Duft., and *H. latus*, L. (*fulvipes*, F.) Under stones near gates of fields or roads, C S G.
H. tardus, Pz. One specimen between Crosby and Waterloo, June, 1879, J W E
H. anxius, Duft. Common under stones.

STENOLOPHUS.

- S. elegans*, Dj. Two, banks of Alt, Hightown, June, 1859, C S G.

ACUPALPUS.

- A. mendianus*, L. Two, with *S elegans*; one at West Derby, C S G; fields near Westminster-road, common, F K; Bidston Hill, J W E.

BRADYCELLUS.

- B. cognatus*, Gyll. Bidston and Flaybrick Hills.
B. verbasci, Duft. (*fulvus*, Marsh). Very abundant behind Wavertree Park, at the foot of a wall; also at Bidston and Flaybrick Hills.
B. collaris, Pk. Bidston Hill Spring, C S G.
B. similis, Dj. Bidston Hill, in heath, September; also on the mosses by Sargeant Johnson, C S G.

POGONUS.

- P. littoralis*, Duft. Under stones on the shore at Eastham and Garston.
P. chaldeus, Marsh. With the preceding species at Eastham.

TRECHUS.

- T. discus*, F. Banks of the Alt between Hightown and Sefton, C S G; near Stanley-road, five specimens, F K.
T. micros, Hbst. With *discus*, C S G; Wallasey Pool, J H S; three specimens near Westminster-road, F K.
T. rubens, F. Same locality as *discus*, C S G.
T. minutus, F. Common in moss, &c.
T. secalis, Pk. Not common on the banks of the Alt, June, C S G.

CILLENIUS.

- C. lateralis*, Sam. Aigburth shore, under stones below high-water mark; Eastham, near the Ferry, C S G.

BEMBIDIUM.

- B. rufescens*, Guer. Wallasey Pool, C S G; frequent under stones, J W E.
- B. obtusum*, Stev. Banks of the Alt, Sefton, September, C S G: two specimens on Flaybrick Hill, September, J W E.
- B. biguttatum*, F. Garston, near the salt works, C S G.
- B. æneum*, Germ. Wallasey Pool, spring, C S G; Aigburth shore, one specimen; common on the banks of the Birket, J W E.
- B. guttula*, F. Common on the banks of the Birket.
- B. quadrimaculatum*, L. Under bank of willows between Upton and Moreton, C S G; Wavertree, J W E; road between Waterloo and Crosby, F K.
- B. quadriguttatum*, F. Abundant in clayey ground.
- B. minimum*, F. (*pusillum*, Gyll.) Bromborough Pool, C S G; banks of River Birket, J W E.
- B. lampros*, Hbst. Abundant amongst moss and under stones.
- B. decorum*, Pz. Raby Brook and Birket, C S G; very abundant among clay behind Wavertree Park and on the Aigburth shore.
- B. monticola*, Sturm. River Alt, Hightown, C S G.
- B. Stephensi*, Crotch. (*affine*, Steph.) Aigburth shore, C S G; J M E.
- B. brunnipes*, Sturm. (*nitidulus*, Marsh). Aigburth shore, C S G.
- B. tibiale*, Duft. Common in brooks on the Cheshire side of the river, C S G.
- B. saxatile*, Gyll. Aigburth shore, a single specimen in 1858, C S G.
- B. femoratum*, Sturm. Abundant on the Aigburth shore, J W E, C S G; behind Leasowe Embankment, J W E; Seaforth, near the shore, F K.
- B. bruxellense*, Wesm. (?) Aigburth shore, C S G.
- B. concinnum*, Steph. Clayey banks of the river, plentiful, C S G.
- B. littoralis*, Ol. Very abundant.
- B. limatum*, Duft. Wallasey and Bromborough Pools, local, C S G.
- B. stomoides*, Dj. River Alt, Hightown, C S G.
- B. pallidipenne*. On the shore about high-water mark at Crosby, under small pieces of drift wood, &c., spring.
- B. paludosum*, Pz. A single specimen from Raby Mere, April, 1858, C S G.

TACHYPUS.

T. pallipes, Duft. Common in damp hollow near the bridge across across the Alt, Hightown, June, C S G.

T. flavipes, L. Common, Raby Mere, C S G ; Stanley-road, F K.

MOTHING AT CHATTENDEN.

BY G. T. PORRITT, F.L.S.

CHATTENDEN is the estate of Lord Darnley, and is situate in North Kent, at about equal distance from Higham and Strood. Ever since my first visit there in July, 1874, it has been one of my favourite localities, and consequently I have repeatedly returned to it since. It is of easy access from London, trains running frequently from Cannon-street, London Bridge, or Charing Cross Stations, and a ride of an hour or a little over brings you to Higham. To collect at Chattenden, however, it is first necessary to obtain permission from Earl Darnley; but a courteous letter to his lordship's steward at Thong, Gravesend, never fails to bring a printed form bearing the requisite authority. Without such authority one may as well stay at home, as old Pankhurst, the keeper, is "down" on every person almost as soon as he enters the woods, and he is a clever persuader who can get over him. But be armed with the necessary "pass," and he is the most obliging of keepers, and will find you a hop-pole on which to fasten your net to catch *Iris* at any time. Either Strood or Higham will do to stay at. At Strood much better accommodation is to be had, but Higham is preferable in other respects, there being excellent collecting all the way from the village to Chattenden. And those who are not afraid to rough it, will find fair quarters at the Railway Inn, near the station, or at the Chequer Inn, a little further on in the village. My first visit there will never be forgotten. A friend had preceded me, and had written me that he was taking *Nola albulalis*, at that time one of our greatest rarities, and almost exclusively in the hands of a dealer at Dartford, who had contrived to keep the knowledge of the locality well to himself. The morning of the 13th of July saw me on my way to Strood, where I joined my friend just before dusk. Fatigued with the long journey, we did not go up to Chattenden that evening, but instead walked to the marshy river side close by, where we took the

lovely *Acidalia emutaria* rather commonly, amongst a number of other species. The next four evenings were devoted to *Nola albulalis*, with what success will be judged when I say that in that time we secured nearly three hundred specimens, fully half of them falling to my net. It occurred in two adjoining ash plantations, right in the Chattenden woods, and in no other spot could a trace of it be found. A few could always be beaten out in the daytime, but it was just at dusk when they began to fly, and then for half an hour the collector who could most quickly box his specimens got most, as one had only to stand still and net them as they rose in profusion from the grass and low undergrowth, flying slowly and conspicuously only about a foot from the ground. As it became darker they got wilder and flew much higher, and were then proportionately more difficult to take. Since that time *albulalis* has found its way into all our collections, although to this day the ash plantations at Chattenden remain its only known British habitat. The following May we went down again for a day, in order to try and find the larva, but entirely without success, though how we missed it seems now inexplicable, as a year later Messrs. W. H. Tugwell and J. P. Barrett found it in numbers feeding on the common dewberry (*Rubus cæsius*); and from a supply Mr. Barrett then kindly sent me, I had the pleasure of giving a full description in this journal (*Naturalist* II., 17.) Since then I have found it myself easily enough.

Although on that journey we missed the larva of *albulalis*, we found that of another species which pleased us almost as much. In the previous year we had frequently netted about the rose-bushes one of our most beautiful and rarest of plumes, *Pterophorus rhododactylus*, and our search for its larva was as successful as the other was the reverse. For a rosebud on almost the first rosebush my friend examined produced the prize, and we were soon able to collect as many as we wanted. They were feeding beneath the leaf which wraps round the rosebud, eating into the bud from the side; others were beneath similar leaves around the young succulent shoots, into which they ate, and were detected at once by the frass at the top of the bud or shoot. On some bushes they were in plenty, so we readily collected about 130, and might easily have got as many more.

Another species common at Chattenden, and one which everyone who begins the lepidoptera is ambitious to take, is the purple emperor butterfly, *Apatura Iris*. The larvæ of this species feed on the numerous sallows growing in the lower part of the woods, but, as is

well known, the imago generally seeks the highest point of ground in its district; and hence it is easily taken in numbers in this particular locality. For through the highest part of the collecting ground is fortunately a sufficiently wide drive with most suitable oak trees growing along each side, and there the *Chattenden Iris* congregate. Armed with nets fixed at the end of long poles, we used to wait for them in the drive; and most exciting it is, and to a lepidopterist one of his greatest treats to see one of these grand butterflies come skimming and gliding over the oaks, and then settle with its brilliant wings, the purple glistening in the sun, as is usually the case, at the end of one of the outermost side twigs of an oak. It then requires a cool head to secure the prize, as using a net at the end of a twelve-foot pole is altogether a different thing from using our ordinary pocket nets. After one or two failures, however, the thing is done, and afterwards there is but little trouble, as *Iris* is by no means so difficult to net as is generally supposed. I have known one collector secure towards 40 during four or five following days at Chattenden.

But to give such detailed accounts of all the interesting species that occur in this locality would take up a great many more pages of the *Naturalist* than can be spared, so we must refer to a few of them but briefly. I have not visited the locality before the middle of May, nor later than the last week in July, consequently all the species alluded to in this article occur in one stage or another during the two months between those dates. Besides *Iris* the butterflies include *Anthocharis cardamines*; *Melitæa Athalia*, about the ash plantations; *Vanessa urticae*, *polychloros*, and *Atalanta* all common; the beautiful *Arge Galathea* in abundance in the open corners of the woods; *Satyrus Ægeria*, *Janira*, *Tithonus*, and *Hyperanthus* all abundant, with *Megæra* less commonly; *Chortobius Pamphilus*; *Thecla quercus* and *W-album*, both plentiful, the former about the oaks, the latter about the elms; *Polyommatus Phlæas*, *Lycœna Alexis*, *Syrichthus Alveolus*, *Thanaos Tages*; and *Hesperia Sylvanus* and *linea*, both "skipping" about the rides in plenty. The Nocturni are also well represented. *Sesia myopæformis* abundant in the apple orchards at Strood; *Zeuzera cæculi*, *Zygæna lonicæræ* and *filipendulæ*; *Nola cucullatella* and *albulalis*, the beautiful *Calligenia miniata*; *Lithosia mesomella*, rather common; *Euchelia Jacobææ*; *Euthemonia russula*; *Liparis chrysorrhæa* and *auriflua* both common, the former on the hedges between Higham and Chattenden; *Orgyia pudibunda* and *antiqua*; *Trichiura cratægi*, larvæ on the whitethorn hedges between Higham and Chattenden; *Bombyx neustria* in profusion; *rubi* and *quercus*; and *Lasiocampa quercifolia*.

As might be expected with so great variety of trees and underwood, the Geometræ are in great force, and beating for them in the broad rides is easy and profitable work. One of the most interesting species is the very local pretty little *Acidalia rusticata*. It does not occur in the woods, but is in profusion on two short adjoining elm hedges at Higham, close to the village, and indeed the first hedges on the way from there to Chattenden. The moths are found sitting on the upper sides of the elm leaves, but near the ground, and are so numerous that five or six dozens may easily be collected in an hour or two any fine day during the middle of July. I have hitherto tried in vain to find its larva, and no one seems to know on what it feeds there, though probably it is one or other of the low plants growing beneath the elm bushes, or possibly on the ivy growing about the lower elm stems. In confinement they are readily reared on knot grass, as are indeed almost all the species of *Acidaliæ*. In the woods the fine *Angerona prunaria* flies very freely, and the dark broad-banded variety seems almost as common as the type. *Scotosia vetulata* is not uncommon; as are also very fine *Cidaria picata*; and *Iodis vernaria* flies about *Clematis vitalba*. In May the delicate *Corycia taminata* is abundant, and a week or two later is followed by its brother *temerata*—both of course about the wild cherry trees. Other species of more or less interest are *Ouropteryx sambucata*, *Venila maculata*, *Eurymene dolabraria*, *Selenia illustraria*, *Himera pennaria* (larvæ plentiful in May), *Pseudopterpna cytisaria*, *Iodis lactearia*, *Hemithea thymiararia* common, *Ephyra omicronaria* common about maple, *E. punctaria*, *Asthena luteata* and *candidata*, *Acidalia scutulata*, *bisetata*, *interjectaria*, *incanaria*, *subsericeata*, *immutata*, *remutata*, *emutaria* (before alluded to), and *emarginata*; *Timandra anataria*; *Strenia clathrata*, very common; *Scoria dealbata*; *Anisopteryx æscularia*, larvæ in May; various *Eupitheciæ*; *Melanthia rubiginata*, very common; *ocellata* and *albicillata*; *Anticlea derivata*, *Coremia ferrugata*, *Cidaria corylata*, *pyraliata*, and very fine *fulvata*; *Eubolia mensuraria*, *bipunctaria*, and *palumbaria*.

No doubt the Pseudo-Bombyces are fairly represented if worked for, though I have only myself taken *Notodonta camelina*. The Noctuæ are numerous, and include some nice species. Perhaps the most interesting to me was *Toxocampa pastinum*, which occurs at sugar and at flowers of *Galium* in July; but is best collected in the larva state in May. It is then just about full-grown, and may be found freely in the ash plantations at night with a lamp. The very beautiful larvæ are most conspicuous, and are usually seen feeding on the top of the fragile *Vicia* plants; or they may be found quite as

easily in the daytime, as the plants which their feeding has bared of leaves—frequently the central stalk being about all that is left—are readily seen : and then, by following the stem down to the ground, a fine fat larva, sometimes two or more, will usually be found coiled up in the moss on the ground. The pale southern form of *Epunda viminalis*, too, is very plentiful at sugar in July, and quite swarms in the larva state in May. The sallow bushes are full of them, and a fair-sized tin box may often be filled with larvæ from one low bush. With them will generally be found a fair sprinkling of those of *Orthosia lota*, with here and there a few of one or two species of the Xanthias. Other larvæ include *Tæniocampa cruda* in plenty, and *miniosa* less commonly ; and in the evening big fat *Tryphæna fimbria* are plentiful enough, along with several of the common *Leucanidæ* and *Noctuidæ*. Of imagos at sugar may be mentioned *Thyatira detersa* and *batis* ; *Cymatophora duplicaris*, common ; *Acronycta psi*, *ligustri*, and *rumicis* ; *Xylophasia lithoxylea* and *hepatica*, common ; *Caradrina Morpheus*, not uncommon ; *Agrotis ravidæ* ; *Tryphæna fimbria*, abundant ; *Gonoptera libatrix*, and many others. The pretty *Erastria fuscula* flies freely in some of the broad rides ; and last May I took a late specimen of *Tæniocampa gracilis*.

Amongst the Deltoides, *Herminia barbalis* and *Rivula sericealis* are both very common ; whilst the Pyrales are represented by *Ebulea crocealis* in abundance amongst fleabane ; a few *Botys cinctalis* ; with *Pyrausta purpuralis*, *Botys verticalis*, *fuscalis*, and *urticalis* ; *Scopula olivalis* and *prunalis* ; *Scoparia cembrae* and *mercurialis* in more or less abundance.

Of Crambites occur *Crambus pascuellus*, *pinetellus*, and *Warringtonellus* ; *Phycis roborella* ; the neat *Rhodophæa consociella*, rather commonly in some of the higher parts of the ground ; whilst *R. tumidella* is apparently abundant about the oaks all over the woods.

A Tinea which pleased me much was the very pretty *Coleophora vibicella* : its larva feeds on the *Genista tinctoria*, and they seemed to abound everywhere where that plant grew. The cases are very noticeable, being just like large black seed vessels, and the plants were perfectly studded with them. On the 26th June, 1878, I collected great numbers of them containing both larvæ and pupæ, from which I reared a large number of beautiful imagos ; as well as a minute hymenopterous parasite which I am told is perfectly new and undescribed.

I did not pay much attention to the Pterophori, except to the rose feeding *rhododactylus*, but *lithodactylus* is very plentiful amongst *Inula dysenterica*; and the snow-white *pentadactylus* is, as might be expected equally abundant and generally distributed.

This paper thus far has treated only of such species as occur at Chattenden, and its immediate vicinity. Those, however, who go there for two or three weeks, and like to vary the collecting as much as possible, have ample scope for so doing; as short excursions for an afternoon's or evening's work may very easily be made from either Strood or Higham. By sugaring in the Thames marshes several good species are taken, such as *Leucania pudrina* and *straminea*, *Senta ulvæ*, very dark *Agrotis cursoria*; pupæ of *Nonagria geminipuncta* in the reed stems, and many other species. Off Gravesend, too, larvæ of the very local *Bombyx castrensis* occur, and indeed a little earlier in the spring are collected there in the greatest profusion. A few hours on the Downs will furnish a good series of *Lycæna Corydon*; with the gay *Ilythya carnella*, *Botys hyalinalis*, &c. In fact pleasant and profitable outings may be made all around the district.

The country around Chattenden is all a lover of nature can require, and is in fact a perfect example of "the sunny south." The immense hop fields, the cherry orchards, the old chalk pits about Higham overgrown with luxurient vegetation, or, as is sometimes the case, made into a prolific garden or orchard, with the owner's cottage built in the midst are things which we dwellers in northern smoky towns know little of. The picturesque railway station at Higham, enlivened all round with its numerous nightingales and other feathered songsters, I have already written of in this Journal (*Nat.* vol. v. p. 168). My Sunday morning's walk last May from Higham up to the beautiful little church on Gad's Hill, about a mile away, and where lived our great novelist Charles Dickens: and the evening at Rochester Cathedral (Rochester being only separated from Strood by the river's bridge), will not be soon forgotten. Nor will another morning's walk, before breakfast, over the grounds of the old Rochester Castle. But why need I write longer? Surely I have said enough to commend the spot to everyone who has the leisure and opportunity of visiting it.

Highroyd House,

Huddersfield, February, 1881.

Short Notes and Queries.

Polia flavocincta, VAR. *meridionalis* IN BRITAIN.—From a description of the variety *meridionalis* (Boisd.) of *Polia flavocincta*, recently sent to me by Mr. W. F. Kirby for the purpose, I find that the form of the insect taken in this district (and I should think in other parts of the West Riding) is that variety. I do not think the paler real type of the species occurs here at all, but *meridionalis* is abundant enough; whilst South of England specimens seem to be all of the paler ordinary type. *Meridionalis* is known in Corsica, but I believe has not previously been recorded as occurring in Britain. Guénée describes *Polia flavocincta* var. *meridionalis* from Corsica as follows:—“The black atoms are so numerous as to make the ground colour dark ashy in male, and grey-black in female. The orange colour is also more intense, and the patches of orange on the subt. l. are surrounded on both sides by ill-defined blackish marks, which lose the sagittate form. Hind wing considerably darker, distinctly bordered with black: the lunule in the cell is well marked, and nearly touches the median line above; while below, where it is still more sharply defined, it is as far from it as in the type.”—GEO. T. PORRITT, Highroyd House, Huddersfield, Feb. 9th.

A CORRECTION.—In the account of the meeting of the Bradford Naturalists' Society, last month, the report is hardly worded to express what I said. I referred to the “supposed animal nature of the Myxomycetes,” by Messrs. S. Kent, F. B. White and others; I did not say that I held them to be of an animal nature. Then again: with regard to the lichens I said that most of the leading botanists—not mycologists—classed them as fungi, neither did I subscribe to this opinion. The fact is, that physiological and morphological botanists mostly swell the ranks of those who hold the Schwendenerian doctrine, whilst practical botanists (followers of Linné), who know most about species, still assert that the lichens are a distinct class of plants.—W. WEST, Bradford, 17th Feb.

REVIEW.—“A List of British Birds,” and “The Graduated List,” H. W. Marsden, Regent-street, Gloucester: 6d.—Mr. Marsden has compiled two more of his useful lists, under the above titles—this time for the benefit of ornithologists and oologists. The first-named, indeed, comprises both lists, the “Graduated” being added as an appendix. Separately, the “Graduated List” is gummed for labelling eggs, and consequently printed on one side only. There are several advantages over other lists we have seen; for instance, the different sections of British birds are clearly and accurately indicated; the occasional visitors of the European faunas; the accidental visitors of exotic faunas; the African, American, Asiatic, and Australian visitors—are not only all added, but the natural habitat of each species clearly shewn. Altogether we consider the lists the most perfect we have seen, and, as such, thoroughly recommend them to our readers.

Rainfall for January.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1881.	1880.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 0·28	7	0·28	* 2·89	26	·11
HALIFAX... (F. G. S. Rawson)	360	0·35	10	0·35	0·49	...	...
WAKEFIELD (E. B. Wriggles- worth)	100	0·34	9	...	...	26 & 29	·08
STANLEY (do.)	250	0·32	11	...	...	26	·09
BARNSELY ... (T. Lister) ...	350	0·38	11	0·38	1·08	26	·09
INGBIRCHWORTH (do.)	853	0·43	11	0·43	1·19	25	·09
WENTWORTH CASTLE (do.)...	520	0·37	8	0·37	1·39	12	·10
GOOLE ... (J. HARRISON) ...	25	0·86	11	0·86	0·20	20	·29

* This is the average to date for 15 years, 1866-80.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting Feb. 1st, Mr. J. Hutchinson (vice-president) in the chair.—Mr. Rowland Gascoigne, F.G.S., read an interesting paper on the continuous coal beds from Leeds by Barnsley to Nottingham.

MEETING, Feb. 15th, Mr. T. Kell, president in the chair.—Mr. C. Bellamy, hon. sec., read a paper on the “Development Theory.” Mr. W. E. Brady, read the entomological report for last season, an extract from which will be given in the transactions to be published quarterly.

BIRD NOTES, Jan. and Feb.—Jan 16th, bullfinches, seen by me near Barnsley, reported in abundance in gardens and hedges around. Black-birds and thrushes returning in small numbers, both reported in song at rare intervals. The black-headed bunting, yellow-hammer and redpolls observed. 27th.—A kingfisher seen flying over the canal to the Dearne, another in Cudworth Brook, and one in Barnsley. 28th.—Heard starlings sing in chorus, on garden trees close to the town, reported in great numbers as well as fieldfares and red-wings, about Cudworth, Walton, and other villages; also great flocks of ring-doves, rooks, and daws. Feb. 1st.—Saw at a bird-stuffer's in the town, a kingfisher which had been frozen to a bough on the Dearne, lived three days; a pied black-bird found starved near Stainlorough, lived a day or two; a fieldfare also starved; a golden plover, and piebald pheasant; he had also a sparrow-hawk and a short and long-eared owl, several bramblings, and

snow-buntings, these visitors from the moorland hills in wintry storms have been more numerous than usual. Wild ducks and geese have moved about restlessly. Mr. Hutchinson reported to the meeting eleven wild geese, Jan. 30th; also a wild swan on the 31st, in the Dearne Valley. The rarest bird is reported by Mr. H. Garland, who has the specimen in his collection at Woodhall; it is the ciril bunting obtained at Bolton-on-Dearne, Jan. 12th. I only find one record of it in South Yorkshire, by Neville Wood, at Campsall in 1837.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Feb. 1st, the president in the chair.—Mr. J. W. Carter read an interesting paper on “The Additions to the Local List of Lepidoptera,” in which he stated that six species of macro-lepidoptera had been added to the locality list during the past year, also ten species of Pyrales, hitherto not recorded, were added. The macro-lepidoptera were as follows:—*V. maculata*, *E. angularia*, *T. batis*, *X. silago*, and *L. ruficinctata*. In addition to the above Mr. Carter exhibited a number of varieties, amongst which were *A. betularia* (black var.), *P. pilosaria*, a black variety frequent in this district; *X. rurea*, *H. defoliaria* (a dark unicolorous form), and *A. fuliginosa*. The president exhibited a number of fossils from Bournemouth. Mr. J. Firth exhibited most of the species of British lepidoptera the females of which are wingless. Mr. J. Saville reported the snow bunting from Rombolds Moor.

MEETING Feb. 15th, the president in the chair.—Mr. J. N. Lee gave an instructive lecture on “Stonehenge: or a Ramble on Salisbury Plain,” in which he described the famous ruins of Stonehenge, and referred to the various theories respecting their origin. Mr. Hyde exhibited two interesting fossils; the president exhibited and made remarks upon the following mosses: *Hypnum virescens*, Malham; *Bryum argenteum*, var. *lanatum*, Blackpool; *Dicranella heteromalla*, var. *elata*, and *Hypnum ochraceum*, var. *flaccidum*, Marsden; *Dicranum scoparium*, var. *alpestre*, Fairfield; *Bryum atropurpureum*, var. *gracilentum*, Westmoreland; *Weissia viridula*, var. *amblyodon*, and *Webera annotina*, var. *angustifolia*, Castleton, Derbyshire; *Pterigynandrum filiforme*, Glen Tilt; *Dicranum fuscescens*, var. *angustifolia*, Glen Lui; and the following from Ben Lawers:—*H. sarmentosum*, var. *subflavum*; *H. exannulatum*, var. *purpurascens*; *Didymodon rubellus*, var. *serrulatus*, *Distichium capillaceum*, var. *brevifolium*; *Dichodontium pellucidum*, var. *fugimontanum*, and *Lescuræa mutabilis*—the latter species new to Britain, collected by Mr. West whilst on a ramble in the Scottish highlands last summer.—H. T. SOPPITT, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting 12th Feb., Mr. A. Mackenzie in the chair.—Geology was well represented by some good specimens brought and named by the chairman, among them being a

piece of clay containing *Potamides ventricosus*, from the upper fresh-water bed; *Ostrea flabellula*, Brockenhurst series; a piece of rock containing shells of *Ditropa plana*, lowest tertiary clay; also *Teredina personata*, from the lower eocene. All the above are from the vicinity of Whitecliffe Bay, Isle of Wight. Calcite crystals, Headon Hill, Alum Bay, and a slab of clay with Cyprides, from the Wealden strata, Sandown Bay, Isle of Wight. Mr. G. H. Crowther showed some specimens of the wry-neck, golden-crested wren, kestrel, and redshank. Mr. W. E. Thomas proceeded to give his lecture on the Planetary Positions of the date, and drew the attention of the members to the splendid group of planets—three in number—which may be seen in the west shining so brilliantly on a clear evening, viz:—Venus, which appears to be by far the largest; Jupiter the next; and Saturn higher still, also in the same direction.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—First meeting of the present session, Jan. 31st, the president, Mr. S. J. Capper, in the chair.—The society elected the following officers for the current year:—president, Mr. S. J. Capper (re-elected); vice-president, Mr. Nicholas Cooke; secretary, Dr. J. W. Ellis. After a vote of thanks to the retiring officers, Mr. Capper, in the course of a few remarks, stated his appreciation of the confidence expressed by the members of the society in again electing him president. He said that at the formation of the society, four years ago, he expressed a wish that some member more thoroughly acquainted with entomology in all its branches would be elected to the office of president, and he still hoped that before long such a person would be found among the younger members of the society. He congratulated the society on its success, it having commenced four years ago with about half-a-dozen members, and now having about 50. He was much pleased at the general good tone of the papers read before the society during the past year, some of which have been printed for distribution among the members. A short communication was read from Mr. Dukinfield Jones, and the subject of devoting the balance in the hands of the secretary to the formation of an entomological library for the use of the members was considered, and postponed until the next meeting.—J. W. ELLIS.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—410th meeting, Jan. 25th.—This being the first meeting after the election of officers, and also of the current year, the president, Mr. W. Barwell Turner, F.C.S., F.R.M.S., delivered his inaugural address, which he entitled "The Origin of Organic Life." A discussion followed.

411TH MEETING, Feb. 1st, the president in the chair.—Mr. James R. Murdoch showed several mosses from North Wales, including *Mnium undulatum*, *Bartramia Cederi*, and *Hookeria lucens*; also *Ectropothecium*

cyperoides and *Dicranum undulatum*, collected in Ceylon by Mr. T. W. N. Beckett, of Abergele. Mr. W. Atkinson exhibited specimens of ancient pottery, comprising a bottle and jug of Roman ware, an Egyptian lamp, with imprint of an ibis, a lamp of Etruscan ware, and a very perfect and curious lamp of clay, which was evidently a predecessor in form to the Roman and other lamps. Microscopical exhibits were made by Messrs. F. Emsley, C. R. Newton, and W. B. Turner, and also on behalf of Mr. J. D. Butterell, of Beverley. Four birds, taken in Eastern Central Africa by the late Rev. A. W. Dodgshun, were shown on behalf of Mr. W. Denison Roebuck. The names, as determined by Dr. Hartlaub, of Bremen, are *Euplectes capensis*, *Hirundo puella*, *Melanopepla atrombeus* (*Bradyoxoris ater*), and *Nectarina Jardinei*. Towards the close of the meeting there was a short discussion on microphotography.

412TH MEETING, Feb. 8th, the president in the chair.—Mr. W. Atkinson exhibited a box of insects from India, containing specimens of beetles, lantern-flies (*Fulgora candelaria*), grasshoppers, &c.; and also various British lepidoptera, amongst which was the Camberwell beauty, *Vanessa Antiopa*. Mr. Walter Raine showed a beautiful series of eggs of the sparrow-hawk and kestrel from Adel, Roundhay, York, and Bishop's Wood, near Selby; and likewise eggs of the merlin from Darlington, red-footed falcon from Turkey, and peregrine falcon from the Bass Rock, Scotland; Mr. Henry Marsh, the skull and claws of a young panther killed in Bengal by Major Temple. Mr. Chas. Smethurst brought a small collection of foreign butterflies, comprising specimens of *Euplaea*, *Plescippe*, and *Pieris*; Mr. John Kirby showed several saws of saw-fish, and also a curious whip-like tail of an Indian flat fish; the president, a number of drawings of parasitic insects, or *Anoplura*, executed by himself from specimens under the microscope, including *Docophorus platygaster* from the purple sandpiper, and *Lipeurus jejannus* and *Trinoton squallidum*, from the goose; Mr. F. Emsley, slides of *Hydra viridis*, *Oscillatoriaceæ*, from Roundhay, and a double stained section of birch.

413TH MEETING, Feb. 15th, the president in the chair.—Mr. James R. Murdoch showed a number of microscopic slides of mosses collected near Selby, including *Sphagnum squarrosum*, *S. molluscum*, *S. plumosum*, *S. compactum*, *Tetraphis pellucida*, and *Aulacomnion androgynum*; Mr. W. Denison Roebuck, a photograph of a white variety of the common mole, taken alive at Stillingfleet, near York, in March, 1879. Other examples of the same variety occurred there in December, 1879, and March, 1880. All the specimens fell into the possession of Mr. George Edson, of Malton. White varieties of the mole are not uncommon, but the chief point of interest was the persistence of the forms in the same locality. The president brought a collection of *Desmidiaceæ* from North Wales,

comprising *Micrasterias angulosa*, *Staurastrum anatinum*, *T. Sebalii*, *Xanthidium armatum*, and *S. pirotania condensata*. Mr. Washington Teasdale, F.R.M.S., showed a section of a cryptogamic plant (probably *Asteromyelon*) which was discovered about sixteen years ago, by an eminent, though humble, naturalist named Adam Mathison, of Jedburgh, Scotland; Mr. C. R. Newton, a series of slides illustrative of the adulteration of flour with rice, peas, oats, barley, maize, &c. Amongst other microscopical objects Mr. F. Emsley showed parasites of the cornercrake, a stained section of ivy, and earth mites. There were also exhibited several lichens, collected on a piece of wet moorland near Harrogate, by Mr. James Grainge.—H. POLLARD, Sec.

MANCHESTER CRYPTOGAMIC SOCIETY.—At the January meeting of this society, Dr. Carrington, the president, brought before the notice of the members a series of Hepaticæ which he had collected at Killarney in the year 1861. He called especial attention to some specimens of *Radula aquilegia*, which he had described in his "Gleanings amongst Irish Cryptogams," published soon afterwards. One of the specimens was named *Radula aquilegia*, var. *major*, but since that time Dr. Moore and Mr. G. E. Hunt had found it with male plants, and Prof. Lindberg had also, during a visit to Ireland, been fortunate enough to discover the fertile plant. Dr. Carrington having recently received specimens, strangely enough, through the executors of the late Mr. T. C. Austin of America, he now no longer hesitates to rank it as a distinct species, and names it in honour of his late friend Dr. Moore of Dublin, as *Radula Moorei*. Dr. Carrington said that at the time he collected it he was strongly inclined to recognise it as a species, but in the absence of fructification, and in deference to the opinions of Dr. Gottsche and Prof. Lindberg, he had then described it as a variety only.

MEETING, 21st February, Dr. Carrington, F.R.S.E., in the chair.—After the minutes of the previous meeting had been confirmed, Dr. Carrington wished to correct an error in the description of *Radula Moorei*, so far as the reference to the fertile specimens of Prof. Lindberg had been made. Mr. W. H. Pearson exhibited specimens and drawings of *Radula commutata*, of Gottsche's M.SS., a species new to Britain. Specimens of this species had been collected some time ago, by A. Croal, but the particular specimen then exhibited had been collected last July, on the Breadalbane mountains, by G. A. Holt, these, however, had not been recognised as *Radula commutata* until a recent examination made by himself. Specimens of *Lepidozia reptans* were referred to in Carrington's and Pearson's *Hepaticæ Britannicæ Exsiccatae* (which lay on the table), Dr. Carrington pointing out that the particular specimen from Tyn-y-Croes had been examined by Dr. Spruce, and found to be quite distinct, he having had specimens sent to him by Mr. Pearson for that purpose, and which he now named as *Lepidozia Pearsoni*. The examina-

tion of a portion of Austin's collection of American mosses, which had been brought by Capt. P. G. Cunliffe, occupied the rest of the evening. It was suggested that a further examination of these American mosses should be made on a future occasion.—THOS. ROGERS, Hon. Sec.

WAKEFIELD NATURALISTS' AND PHILOSOPHICAL SOCIETY.—Meeting 19th Jan., Dr. Crowther, v.p., in the chair.—The proceedings of the evening were of a varied and interesting description. Mr. J. Spencer, of Halifax, delivered a lecture on "The Fossil Plants of the Coal Measures," illustrated by some very beautiful diagrams of sections, fossil remains, &c. taken from specimens in Mr. Spencer's possession. The subject was thoroughly and clearly explained, and the various fossils common in the coal strata of this district were fully and graphically described. A microscopical soiree of a very instructive character, in which Dr. Crowther, Mr. Spurling, and Mr. C. W. Richardson took part, terminated the proceedings.

MEETING, Feb. 2nd, Dr. Crowther in the chair.—A most interesting paper was read by Mr. Thos. Lister, of Barnsley, entitled "Walton Hall—past and present." The lecturer commenced his address by complimenting the members of the society on their excellent display of microscopes, &c., and also on having secured such a capital room for their meetings; he then briefly alluded to the wonderful effects produced by the snow and frost during the recent severe weather, and spoke of the Creator and His wondrous works, as seen in the largest as well as the smallest objects; and he condemned in the strongest language the mania on the part of many persons to kill everything which comes under their notice in the fields and woods, and then style themselves "naturalists." He then traced the history of the Waterton family, and gave some interesting particulars with regard to Walton Hall, the home of Squire Waterton, the naturalist—to some of whose extraordinary adventures he alluded, and described the valuable collection of lace, books, &c., possessed by the present tenant, Mr. Hailstone. The microscopical section then exhibited several beautiful and interesting objects.—E. B. W.

YORKSHIRE NATURALISTS' UNION.—BOTANICAL SECTION.—This section elected a committee to assist the president and secretaries in the work of the section, it being suggested that much valuable aid could be rendered by post when members could not possibly attend a committee meeting. The following were elected on the committee:—Rev. W. Fowler, M.A., Messrs. T. Birks, W. N. Cheesman, T. Hick, B.A., B.Sc., G. E. Massee, H. T. Soppitt, and G. Webster. Mr. F. A. Lees, F.L.S., offered the manuscript of the West Riding Flora to the section for the Transactions, the section to choose suitable men to edit each group of plants. The section passed a resolution that the fauna and flora sub-committee of the council be asked to accept the offer.—W. WEST.

Diary.—Meetings of Societies.

- March 1. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections, 8 p.m.
- " 1. Liversedge Naturalists' Society.
- " 1. Bishop Auckland Naturalists' Field Club.
- " 1. Bradford Naturalists' Society.—Microscopical Evening, 7-30.
- " 2. Wakefield Naturalists' Society.—"A drop of Water," C. P. Hobkirk, F.L.S., of Huddersfield, 7-45 p.m.
- " 3. Linnean Society of London, 8 p.m.
- " 7. Bradford Scientific Association.—Evening for Discussion, "The Improvement of the Society," 7-30 p.m.
- " 7. Leeds Naturalists' Club, &c., Microscopical and Botanical Sections, 8 p.m.
- " 9. York and District Naturalists' Field Club.
- " 11. Dewsbury Naturalists' Society.
- " 12. Huddersfield Naturalists' Society.—"The Character and Structure of Birds," James Varley.
- " 14. Bradford Scientific Association.—"Physical Geology of Coast Lines," P. Ross.
- " 15. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
- " 15. Bradford Naturalists' Society.—"Manure and the Assimilation of Plants," T. Richmond.
- " 16. Wakefield Naturalists' Society.—"Dentition of the Insectivora, Ruminants, and Carnivora," Dr. Crowther, L.D.S.
- " 17. Linnean Society of London.
- " 17. North Staffordshire Naturalists' Field Club.—Meeting at Stoke, Local Secretary, Wm. Kirby.
- " 21. Bradford Scientific Association.—"Influence of Climate on Animal and Vegetable Life," Wm. Jagger.
- " 21. Manchester Cryptogamic Society, at Old Town Hall, King Street, 7-30 p.m.
- " 22. Leeds Naturalists' Club, &c.—Microscopical and Botanical Sections.
- " 28. Bradford Scientific Association.—"The Transit of Venus," W. T. Phillips.
- " 28. Lancashire and Cheshire Entomological Society.
- " 28. Huddersfield Naturalists' Society.—"British Birds," S. L. Moseley.
- " 29. Leeds Naturalists' Club, &c.—Conversazione.
- " 29. Bradford Naturalists' Society.—"Natural History Observations," A. Crawshaw.

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THE YORKSHIRE NATURALISTS' UNION, ITS ORIGIN, CONSTITUTION, AND MODES OF WORKING, WITH REMARKS UPON THE STUDY OF NATURAL HISTORY.

BY H. BENDELACK HEWETSON, M.R.C.S., LEEDS.

THROUGHOUT every historically recorded era in the progressive development of nations, there has always been, at one time or another, some special mark of the intellectual standing of the period. For instance, one nation would be notable for its arms, another for its arts or its philosophy, and so on; but it would seem that it has remained for the eighteenth and nineteenth centuries of the Christian era to be peculiar among all other times for the universal study of natural history and natural science. The application of the knowledge so gained has resulted in being the chief motive power of the nation. Another effect is the formation of a school of Natural History painting, which by far transcends any previous efforts at recording in faithful imagery organic and inorganic forms. From what other age could we obtain botanical illustrations approaching those produced by Curtis or Sowerby, or the illustrations of shells in Reeves' *Conchologia Iconica*? What other period has produced an ornithological woodcutter equal to Bewick, or the last perfection of bird painting reached by Mr. and Mrs. John Gould, who have by elaborate labour succeeded in transcribing the iris of the humming bird or the dazzling beauty of the king bird of Paradise? Again, the magnificent bird-painting by Keulmanns in his illustrations of that monumental work—just about completed—Dresser's Birds of Europe. The painting of exotic butterflies and the eggs of British birds by the late W. C. Hewitson are simply beyond all praise, as are also the colored drawings of Agates, by the greatest of art critics, and a deep student of nature—John Ruskin.

What other age in the history of the world has produced such a wonderful series of naturalists as Baron Cuvier, Linnæus, Darwin, Owen, or Huxley, besides many more of vast intellectual power, although not gifted with that inborn grant—original thought?

The wave of investigation into the hitherto hidden regions of natural history and natural law, has been swelling vaster and vaster of late years. Hardly a town of any importance exists without its natural history society, or its field club. Natural history is also taught in schools as a matter of daily routine, and even young ladies are scarcely looked upon as "finished," unless they have attended and obtained certificates in Physiology, upon a course of lectures by

some itinerant professor, and can satisfy the examiners that they do possess sufficient knowledge for their peculiar station in life, as to their innermost pulsations and ultimate neuro-ramifications. It is not however, the object of this paper to follow either in cause or effect the results of such broad-cast natural history, but rather to show the origin and modes of working of field naturalists in societies, and the advantages derived from a general union of such societies, which shall at various meetings in their county, at specially selected spots discuss and place on record the observations of the different sections from time to time.

In the early part of this century the formation of philosophical and literary societies did good work in arousing attention to the study of natural science and by collecting in their precincts museums, at the same time providing lectures for the instruction of general audiences, who required that the subject should of necessity be lowered to the level of their existing state of ignorance. It was therefore in the hands of a few only to investigate and teach. There were many, however, who, pent up day by day in the dingy offices and the dull shops of our large towns, longed for a more intimate knowledge and deeper personal acquaintance with nature as it worked in its reality. Their appetite for such was, however, not appeased—though probably considerably whetted—by the demonstrations of the periodic lecturer. To supply this want, Natural History societies were started by those who felt the want the most, and whom, I fear, have rather been despised than assisted by their “Philosophical brethren” in their more stately habiliments. The might of right, however, always flourishes by opposition, and many a working man and cottager meet agreeably on equal footing the professional man, or retired gentleman for a pleasant evening’s chat, interesting and instructive alike to each—especially the latter. In Yorkshire many such societies have had their origin, and have bravely struggled on amidst damping clouds of quiet contempt, kept together mainly by that guiding star, enthusiasm, thirsting after hidden knowledge and concealed revelation. The first attempt to amalgamate and give a common object to the working of Naturalists’ Field Clubs in Yorkshire was brought about under the title of the “West Riding Consolidated Naturalists’ Society,” whose object it was to investigate the fauna and flora of the West Riding, and meet for discussion. Unfortunately, however, the utility of their work is entirely lost, there being no medium in which their observations could be recorded and preserved. About the year 1876—stimulated by that energy which is the happy instigator

of but a few men earnest in their attachment to Nature—the West Riding Consolidated Naturalists' Society received new blood, a fresh impetus which led to the formation of a council of management, and the extension of the Society's title to that of the "Yorkshire Naturalists' Union," which had for its objects the investigation of the Natural History of the whole of Yorkshire. At the same time it was resolved that the transactions of the Union should be preserved in a suitable manner, so that the records in ornithology, entomology, botany, conchology, &c., should each have their apportioned pages in the transactions, and retain their individual sequence. I will refer, for example, to a most important work, at present in progress, by Mr. W. Eagle Clarke, which is intended to record, in their natural order, all obtainable information relating to the occurrence and habits of Yorkshire birds. Messrs. Nelson & Taylor, of this town, are producing a like work in conchology. Mr. Porritt intends to carry out a similar work on lepidoptera. I must ask pardon for passing over these sections without a remark, being obliged to confess that I am not cultivated enough in their especial lines to make any criticism of mine of value. Reports of the sections into which the Union is divided are prepared upon this principle—that when complete they can be bound in separate volumes, which will enable a future reader to obtain whatever information he may be in search of more readily. The Union was finally remodelled in 1877, and the working is continued as successfully as it was then commenced.

The ultimate success of the Yorkshire Society, and its smooth transition from the ovum to the imago, I am reminded was in a large measure due to the geniality and untiring zeal rendering popular the Rev. William Fowler, M.A., who held the presidential helm, and guided safely and surely the reunion to its ultimate completion. Dr. Clifton Sorby, F.R.S., next filled the presidential chair, followed by Professor Williamson, F.R.S. It needs no words of mine to show the enormous advantage derived by the Union from its possessing on its council such marked examples of truly scientific and eminently original men.

It is the custom for the Yorkshire Naturalists' Union to meet about six times a year. Previous to the meeting the locality is fixed upon, and a general sketch, sent in prospectus, pointing out the chief natural features of interest to each section. A map of Yorkshire is being prepared, which will greatly assist in this respect, and enable the various sections to set to work, at once, upon their arrival at the place of meeting. The day over (and a meal disposed of with a relish, to which the fresh air and an enthusiasm known only to naturalists greatly

contributes), the president of each section sets before the general meeting the chief features of the day's work, selecting such as may be considered most interesting or important. The next question which suggests itself to my mind is, what is the outcome of the study of Natural History as regards its effect upon ourselves and its results upon the indigenous plants and animals of our country? If carried on in the proper spirit of honest research, as a true naturalist, not as a mere collector, the result is undoubtedly of the highest benefit to the community. Nothing tends to refine and humiliate a man more than Natural History pursuits of one kind or another; humiliate, because every atom of further knowledge gained only goes to prove to an honest thinker the vast extent of his own ignorance; and what can be more refining than to become conversant with the infinite loveliness and exquisite refinement of Nature? There are, however, naturalists, and *naturalists*—men of the collector type, to whom the possession of an object is of far more attraction and importance than any history or knowledge about that object. Collectors certainly do discover a new species, or occasionally an unrecorded diatom; but what assistance is given to Natural History investigation by men who do this, when they are ignorant of the life-history of the commonest objects in Nature, and totally insensible to their beauty—merely because it is common, and what every one has got, therefore (lovely and interesting though it may be) beneath their notice? This is not Natural History, nor will science be advanced one whit by such a type of naturalist. No. The greater the man, the more the common objects around his every-day life open out marvels to his imagination, and picture wondrous images to his restless fancy, leading him onward deeper and deeper from the known to the yet unknown.

I am told that there is a great rage just now amongst "insect collectors" for varieties. No one can say one word against the study of varieties whereby some scientific problem can be elucidated as the outcome of natural inherent tendencies, or as an evidence of the results of obstruction to natural development. But there are processes whereby varieties of lepidoptera are manufactured to meet the existing requirements of the insect market. I hear of entomologists who first feed the larvæ upon its own wholesome diet, and then upon something else totally at variance with the natural tendencies of its appetite. At the same time the unhappy caterpillar is subjected to the alternate heat of a warm fire, and the cold of a damp cellar. Now these experiments are all very well in their way, but they have clearly a tendency to divert men from the true objects and aims of Natural History study—in fact, to make them followers of artificial history.

The aims, then, of Natural History societies must be based upon the great principle of *protecting* as well as *observing* the objects of their study—a study which is so engrossing, and contributes so markedly towards lighting up the deep shadows in our lives.

One important feature of the Field Naturalists' societies is, that they are in direct opposition to the miserable skeletonised mockery of a closet naturalist. Let it be the object of all naturalists to study the out-door features of Nature: not to be annihilating all that is rare or beautiful to satisfy a too-frequent craving for collecting. But rather let them be collectors of historical details and facts in the life-history of plants and animals. Finally, the true naturalist must so guide and control his study that, in the eagerness to possess, he will not abdicate his position as a MAN—and “pity the plumage, but forget the dying bird.”

YORKSHIRE NATURALISTS' UNION.—CRYPTOGAMIC REPORT FOR 1880.

BY WM. WEST, CRYPTOGAMIC SECRETARY.

OUR “Transactions” have hitherto (up to the end of 1879) included a record of what has been done during the year by members of the Union at the meetings, and also a record of the best work done in Yorkshire by members privately. It is now wished that this part of the labours of the Union may appear in the organ of the Union—the *Naturalist*—and that the Transactions in future shall consist of systematic and thoroughly authentic lists of the recent and fossil fauna and flora of the county as complete as it is possible to provide them, and of additions to such lists. Repetition of records should be avoided as far as possible; I therefore do not intend to re-mention anything that has already appeared in the reports of the Union meetings as given in the *Naturalist*.

When we state what number of Cryptogams have been collected at the meetings of the Union, we speak with regard to those fully recognised in the field or at the meetings, also in the report in the *Naturalist* we speak of those recognised up to the date of writing the report; but in addition to these there is usually a surplus left unworked up, and it is mostly for these remnants that we are indebted for anything now mentioned. A large number of these “arrears” are still unexamined, so that until these are exhausted we cannot fully estimate the work accomplished by means of the “rambles.”

The only additions worth mentioning for the Masham excursion are the following :—*Sphagnum acutifolium* Ehrh., var. *rubellum* Wils., *S. cuspidatum* Ehrh., var. *plumosum* Nees, *Campylopus pyriformis* Brid., *Barbula lævipila* Brid., *Pogonatum urnigerum* L., *Leucodon sciuroides* L., *Eurhynchium myosuroides* L., and *Hypnum exannulatum* Gumb., to the mosses ; *Trichocolea tomentella* Ehrh., *Radula complanata* L., *Plagiochila asplenoides* L., and *Jungermannia barbata* Schreb., to the hepatics.

The best additions to the list for the Castle Howard meeting are—*Barbula spadicea* Mitt., *Ulota Bruchii* Hornsch., *Fissidens viridulus* Wils., and *Rhynchostegium murale* Hedw., to the mosses, and *Gomphonema olivaceum* to the algæ.

There is nothing worthy of note further than what has already appeared for the meetings at Barnsley and Boston Spa.

Peziza hepatica Batsch., *Cymbella gastroides* Kg., *Cosmarium margeritiferum* Breb., and *Cosmarium pyramidatum* Breb., were collected at Marsden.

The best addition to the Market Weighton list is *Polyporus annosus* Fr.

The following lists illustrate the best finds of members during the year, whilst privately investigating the flora of the county :—

VASCULAR CRYPTOGRAMS.

Lycopodium Selago, L., near Selby, W. N. Cheesman. A rather interesting discovery in such a locality, the altitude being only about 20 feet. Mr. Cheesman writes :—" I found it last autumn, growing in a railway delving about a mile from the town at the extreme border of the West Riding. I am not aware of its occurrence anywhere in the district. The plants numbering about 20 or 30, were growing in a patch of rather elevated sandy soil in the cutting, the subsoil of which had been thrown up for the railway embankment. The lycopod was fruiting freely, and seemed as much at home as some I had observed a few weeks before on Ingleborough. * * * I should like to know how it is that L. Selago has sprung up in this place. Is this plant another 'relic of a boreal age,' and have the spores lain dormant in the ground during the ages that have passed since the last glacial period, and become quickened into life through the sun's influence on the removal of the two or three feet of soil from the present ground ?" Mr. Cheesman then invites opinions on this occurrence.

Chara foetida, Braun. Bog near Malham Tarn, W. West.

C. hispida, L. Askern, H. T. Soppitt and P. F. Lee.

MOSESSES.

Sphagnum subsecundum, Nees. Langwith ; new to South-east Yorks.

G. Webster.

S. squarrosum, Pers. Askham Bog, G. Webster.

S. subsecundum, Nees. β . *contortum*, Schultz., Strensall, G. Webster.

S. rigidum, Schpr. Aislaby Moor, G. Webster.

Andreæa petrophila, Ehrh., var. *acuminata*, Schpr., Penyghent, W. West.

A. Rothii, W. & M. Penyghent, W. West.

A. falcata, Schpr. Penyghent, W. West.

Rhabdoweissia fugax, Hedw. Penyghent, Nuttall and West.

Dicranum fuscescens, Turn. Inglebro', W. West ; in fruit at Goathland, M. B. Slater.

Campylopus flexuosus, Brid. New to S E Yorks., G. Webster.

Campylostelium saxicola, W. & M. Goathland, Slater and West.

Seligeria pusilla, Hedw. Great Blake Gyll, Nuttall and West ; Wass Bank, N E Yorks., G. Webster.

Brachyodus trichodes, W. & M. Castle Howard, M. B. Slater.

Ditrichum homomallum, Hedw. Goathland, Slater and West.

Barbula ambigua, B. & S. Cottingley, W. West.

B. recurvifolia, Schpr. Litton, Nuttall and West.

B. spadicea, Mitt. Gordale, W. West.

B. cylindrica, Tayl. Castle Howard, M. B. Slater.

B. latifolia, B. & S. Derwent Bank, M. B. Slater.

B. intermedia, Brid. Bell Busk, W. West.

Distichium capillaceum, L. Bolton Woods, W. West.

Amphoridium Mougeotii, B. & S. Great Whernside, W. West.

Ulota Bruchii, Hornsch. Gordale, W. West.

Splachnum sphaericum, L. fil. Great Whernside, W. West.

Entosthodon ericetorum, Bals. Goathland, Slater and West.

Bryum pseudotriquetrum, Hedw. Garten in Holderness, G. Webster, new to S E Yorks.

B. erythrocarpum, Schwg. Seamer Moor, G. E. Massee.

Mnium undulatum, Hedw. Fruiting near Wetherby, F. A. Lees ; fruiting at Douk Ghyll, W. West.

Aulacomnion androgynum, L. Castle Howard, M. B. Slater ; Riccall, Cheesman and West ; Goole, T. Birks.

Tetraphis pellucida, L. In fruit, Arncliffe Wood, Egton, M. B. Slater.

Tetradontium Brownianum, Dicks. Goathland, Slater and West.

Fissidens pusillus, Wils. Castle Howard, M. B. Slater.

- Heterocladium heteropterum*, Bruch. Goathland, Slater and West.
Thuidium recognitum, Hedw. Near Hildenley, M. B. Slater.
Orthothecium rufescens, Dicks. Penyghent, W. West.
Pterygophyllum lucens, Sm. Middlesmoor, W. West.
Isothecium myurum, Poll. Clepham, W. West.
Rhynchostegium curvisetum, Brid. Near Whitby, M. B. Slater; a new county record.
R. murale, Hedw. Gordale, W. West.
Plagiothecium Borrerianum, Spruce. Ingleborough, Penyghent, W. West; Goathland, Slater and West.
P. denticulatum, L. var. *aptichus*, Spruce. Langwith; new to S E Yorks., G. Webster; Coneysthorpe Bank Wood, M. B. Slater; new to N Yorks.; Goathland, W. West.
Hypnum aduncum, Hedw. β . *Kneiffii*, Br. Eur. Askham Bog, G. Webster.
H. chrysophyllum, Brid. Sleamere, G. Webster, new to S E Yorks.
H. polymorphum, Hedw. (ft.) Castle Howard, M. B. Slater.
H. cordifolium, Hedw. Diggle, C. P. Hobkirk.
H. scorpioides, L. Ingleborough, W. West.
H. squarrosum, L. (in ft.) Gordale, Crebbin and West.

HEPATICS.

- Lejeunia echinata*, Hook. Penyghent, W. West.
L. serpyllifolia, Mich. Great Blake Ghyll, W. West.
Lepidozia reptans, L. In fine fruit, Cum Hagg Wood, Castle Howard, M. B. Slater.
Odontoschisma Sphagni, Dicks. Harrogate, F. A. Lees; Malham, W. West.
Cephalozia multiflora, Spruce. Goathland, M. B. Slater; Esholt, W. West.
C. connivens, Dicks. Terrington Carr, Goathland Moor, M. B. Slater.
C. laxifolia, Hook. Goathland, M. B. Slater.
C. curvifolia. Goathland, M. B. Slater.
Chyloscyphus polyanthos, L. Near Huddersfield, C. P. Hobkirk; β . *pallescent*, Ehrh., Ray Wood, Castle Howard, M. B. Slater.
Harpanthus scutatus, Nees. Arncliffe Wood, Egton, M. B. Slater.
Kantia arguta, Nees. and Mont. Goathland, M. B. Slater.
Trichocolea tomentella, Ehrh. Pateley, T. Hick.
Blepharostoma setacea, Mitt. Collingham, F. A. Lees.
Plagiochila asplenoides, L. Fruiting at Arncliffe Wood, Egton, M. B. Slater; fruiting at Douk Ghyll, Horton in Ribblesdale, W. West.

- Myia Taylori*, Hook. Ingleborough, Penyghent, W. West.
M. anomala, Hook. Riccall, W. West.
Eucalyx obovata, Nees. Clapham, W. West. Goathland, M. B. Slater.
E. hyalina, Lyell. Goathland, Slater and West.
Jungermannia lanceolata (in fruit). Shipley Glen, W. West, jun.
J. cordifolia, Hook. Penyghent, W. West.
J. sphærocarpa, Hook. Penyghent, Bingley, W. West.
J. riparia, Tayl. Rokeby, M. B. Slater.
J. exsecta, Schmid. Harrogate, F. A. Lees.
J. minuta, Crantz. Goathland, M. B. Slater.
J. capitata, Hook. Grosmont, M. B. Slater.
J. bicrenata, Lindb. Do. do.
Aneura sinuata, Dicks. Near Huddersfield, C. P. Hobkirk.
Sphærocarpus terrestris, Sm. Castle Howard, G. E. Massee.
(To be continued.)

INSECT-HUNTING IN SCOTLAND.*

BY NICHOLAS COOKE.

ABOUT last meeting, our worthy secretary suggested that I should write a paper on the above subject for the next meeting, which I willingly consented to do, and thought of commencing by making some excuse for the matter of it; but when we consider the simple fact that the richest clothing worn by the ladies of all lands is the produce of a moth, insect-hunting needs no apology, nor does it want recommendation.

When I thought of the many delightful hours I have spent whilst hunting for insects, in company with other kindred spirits (some of whom are gone to a brighter clime and happier hunting-grounds), the words of a poet were brought to my recollection :—

“ Man cannot stand beneath a loftier dome
 Than this cerulean canopy of light,
 The Eternal’s vast, immeasurable home,
 Lovely by day, and wonderful by night;
 Than this enamelled floor, so greenly bright,
 A richer pavement man hath never trod.
 He cannot gaze upon a holier sight
 Than fleeting cloud, fresh wave, and fruitful sod—
 Leaves of that boundless book writ by the hand of God !”

My first journey to Scotland was in June, 1864, in company with my sons Benjamin and Charles. We arrived at Rannoch on the 25th

* Read before Lancashire and Cheshire Entomological Society, Feb. 28th, 1881.

of that month, and lodged at the hut of Miss Cameron, the postman's sister who drove us from Pitlochry railway station to this place, a village named Camachgouran, about three miles from the head of Rannoch. In this hut of two small rooms, a kitchen and parlour and bedroom combined, we were made very comfortable by the tenant, who kept a cow, so that we were supplied with good milk, butter, and eggs, but could get little else, except bread and oatmeal. Nothing better is needed by those who are determined to enjoy the country life such as we went there on purpose for. The worst of it was, the want of light, the only window in the room being but about eighteen inches square.

We worked chiefly on property belonging to Mrs. Robertson, now living at Cross Crag, close to the village at the edge of the Loch, but when we were there she lived in a large house at the head of the Loch. She likes to be asked permission to collect insects on her ground, but we did not find this out till afterwards. I asked her permission to fish the Loch one day, and she kindly gave me liberty to do so, and sent her keeper to wait on us with her boat.

At sugar we got plenty of *Rectilinea*, *Adusta*, *Brunnea*, *Festiva*, *Duplaris*, *Ferruginea*, *Trilinea*, *Dentina*, with a few *Occulta* and *Tincta*, the latter very shy, flying off on our approach. To capture them you must either be quick or make them drunk by adding plenty of rum to the sweets. We got other common species at sugar, and on the low ground took on the wing *Blandiata*, common, also *Cæsiata* and *Ruptaria*, &c.; on the mountains *Salicata*, *Munitata*, *Alpinalis*, *Schulziana*, *Geringana*, *Coniferata* &c., also one *Glaucia* was brought to us by some person. On the summits of Cross Crag and Scheialion we took *Trepidaria*; it was flying on the latter mountain at an elevation of about 3,500 feet at eight o'clock a.m.; and on the former we found it at all hours of the day. I found pupa skins of *Scoliaformis* sticking out of birch trunks, and some old stumps long since dead were completely riddled by this species. I sent one of my sons to Rannoch on purpose to get this insect the following year, as we were then too late, the weather having been very hot; but he only obtained three specimens. He, however, obtained a remarkably rich specimen of *Hirtaria*, some fine *Carbonaria*, and on a mountain *Melanopa*, but not many of either. When sugaring, we found each night a considerable number of that beautiful beetle, *Cetonia metallica*, on the old sugar.

On the 24th June, 1866, I visited Edinburgh. Mr. Edwin Birchall, who had intended to join me, could not leave home as he had hoped, but sent his son Howard, who afterwards joined me at Fort William; and I found on Arthur's Seat fresh specimens of *Artaxerxes* flying. An old man kindly showed me the spot most frequented by this

butterfly, which is on the east side, close to a wall, and in a few minutes I boxed about a dozen, and then went away, as it was Sunday afternoon, and a large crowd had soon collected round me.

After Mr. Howard Birchall met me at Fort William, we proceeded to Spean Bridge, and obtained lodgings at a farm-house named Juch, about three miles up the river Spean; but I spent a day before he came to me in Glen Nevis, where I found *Alexis* and *Davus* in plenty flying over the heather, also *Fumata*, and *Chærophyllata* in the greatest profusion; and higher up Ben Nevis *Munitata* and *Salicata* (common), also a *Carabus nitens*, the only specimen it has been my good fortune to see alive. On the 27th we took *Alpinalis* and *Epiphron* in plenty on Ben-e-Bhean; near the river, at sugar, *Occulta*, *Batis*, *Contigua*, *Menyanthidis*, *Leporina*, *Augur*, *Festiva*, *Conflua*, *Exclamationis*, *Plecta*, *Gemina*, *Pallens*, *Impura*, *Lithargyria*, *Rumicis*, *Adusta*, *Basilinea*, *Rurea*, *Polyodon*, *Pronuba*, *Duplaris*, *C-nigrum*, *Pisi*, *Dentina*, *Lucipara*, &c. My object in visiting this locality was to ascertain if Mr. Buxton's report in the *Entomologist* that he had seen pupa skins of *Scoliaeformis* sticking out of birch trees near Roy Bridge was correct; and on the 28th June I examined the trees on the river bank, where the river Roy joins the Spean, but could find no trace of the moth. I took a singular variety of *Camelina* here, and at sugar *Tincta*, *Nebulosa*, *Brunnea*, *Bella*, *Rectilinea*, *Festucæ*, *Porphyrea*, *Ferruginea*, *Oleracea*, *Suffusa*, and *Despecta*; on the 4th July, *Cubicularis*, *Unanimis*, *Triangulum*, *Typica*, *Meticulosa*, *Thalassina*, and *Baja*. On the mountain I took *Ruficinctata*, *Munitata*, *Salicata*, *Alpinalis*, *Sylvellus*, &c.; on the moor *Davus* was in good condition, but not numerous. *Selene* was common by the side of the river Cour, and we saw a few *Napi* very much darker than our English type.

(To be continued.)

Short Notes and Queries.

Picus major AT SKIRCOAT.—On the 1st of March, a gentleman at Skircoat put some suet and birdlime to catch a pair of great-tits, under the impression that they were blackcaps (*Sylvia atricapilla*). He caught a fine female specimen of the great spotted woodpecker (*Picus major*), which he kept three days and then set at liberty.—C. C. HANSON.

THE LARK was heard in full song by Mr. Berry, near his house, Broomfield, Fixby, near Huddersfield, on 7th March, and by ourselves on the 10th, near Storthes Hall.—Eds. *Nat.*

CUCKOO.—A correspondent informs us that he heard the cuckoo several times on the morning of the 12th March, at Netherton, near Huddersfield, and called the attention of others of his family to bear him witness. This is earlier by at least a month than its earliest recorded appearance

in this district, and on our expressing our doubts about it, he positively asserts that there can really be no question of the fact, as it was heard by others on the same morning, though not since. Can any of our correspondents confirm this extraordinary statement?—Eds. *Nat.*

CORRECTION.—There is a slight error in my paper on “The Coleoptera of Liverpool and Neighbourhood.” It is the capture of *Dromius linearis* and *Demetrius atricapillus* on mugwort (*Artemisia campestris*); it ought to have been “on *A. vulgaris*.”—JOHN W. ELLIS, 138, Crown-street, Liverpool, March 2nd, 1881.

REVIEW.—“British Birds: their Nests and Eggs. By S. L. Mosley (Huddersfield and Hartlepool).” In monthly parts, superior edition 2s., cheaper edition 1s.: Nos. I., II., and III.—Although we have no lack of books on British birds and their eggs, we think there is still quite room for one of the character of Mr. Mosley’s. Each part contains four beautiful plates, hand-colored by the author, in almost every case from examples of birds and eggs in the cabinets of our ornithologists and oologists—two of them representing the birds, and the other two the eggs, described in the part. The text is clear and distinct, although we notice an occasional slight printer’s error; and full and accurate particulars as to size, plumage, flight, migration, nest and eggs, of each species and variety are given. The whole is corrected and revised by a well-known ornithologist, one of our most honoured naturalists, and a Fellow of the Zoological Society; for although his name does not appear in connection with the work, we at once guessed who it was. The superior edition is very well got up, and the cheaper one is not far behind it; indeed for all working purposes we think it quite as good as the other. It may be as well to add, also, that the “Birds” and “Eggs” may be had separately at half-price.

“North Staffordshire Naturalists’ Field Club and Archæological Society: Fifteenth Annual Report, 1880.”—We have just received the above report, which, as usual, is a model of completeness. It contains full reports of all the excursions which have been made, and of papers read, which are of great interest. It is evident that the Society is a prosperous one, and doing good work, and we heartily commend their example, both of the work and its method of record, to other kindred institutions.

Obituary.—We deeply regret to record the death at the early age of thirty-five, of Mr. Edward R. Alston, F.L.S., well known for his researches in connection with the birds and rodents. Mr. Alston had always been very delicate, but had given promise of soon becoming one of our foremost men in his knowledge of the rodents, &c. He had recently been elected secretary of the Linnean Society of London, and the Fellows of that Society, at the meeting on March 17th, shewed their sympathy, and their grief at his loss, by adjourning the meeting directly the formal business was disposed of.—Eds. *Nat.*

Rainfall for February.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1881.	1880.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4·09	14	4·37	* 5·59	14	1·06
HALIFAX... (F. G. S. Rawson)	360	6·10	18	6·45	5·14	...	...
WAKEFIELD (E. B. Wrigglesworth)	100	3·34	18	3·68	...	14	·81
STANLEY..... (do.)	250	3·18	17	3·50	...	14	·91
THORNES..... (do.)	90	3·20	17	3·61	...	14	·85
BARNSELY ... (T. Lister) ...	350	3·07	19	3·45	3·25	9	·56
INGBIRCHWORTH (do.)	853	4·61	25	5·04	5·83	9	·90
WENTWORTH CASTLE (do.)...	520	3·92	19	4·29	3·86	14	·72
GOOLE ... (J. HARRISON) ...	25	3·03	20	3·89	1·63	14	·68

* This is the average to date for 15 years, 1866-80.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting March 1st, the president, Mr. R. Kell, in the chair.—A paper on “Walton Hall—past and present,” was read by Mr. Lister.

MEETING March 15th, Mr. Thos. Lister in the chair. — A paper on geology, illustrated by specimens (many from the Barnsley coal-beds), was given by Mr. Geo. Milner. The entomological section reported, through Mr. W. Brady. Several mammalia and bird occurrences were reported; the most remarkable was a female otter taken in the Dearne at Broomhill, Feb. 22nd. Most of our resident songsters have been noted in song. Feb. 18th, two flocks of wild geese, of above thirty in each, flying over Swithen north; 21st, chaffinch heard in song; 26th, lapwings return in great numbers into the Dearne valley, also a golden plover at Swithen; 27th, the keeper at Walton Hall reports a peregrine falcon striking a ring-dove; he has again noted the rough-legged buzzard and merlin. March 4th, Mr. Griffiths heard the yellow bunting sing, also the great tit; 8th, many goldfinches noted by Mr. G. H. Teasdale, of Silkstone; 12th, Mr. J. H. Salter, of Ackworth School, reports wigeons about Nostell and Walton, and two snow buntings, one of which was obtained by a gunner. Redwings frequent, but no fieldfares.

BRADFORD NATURALISTS' SOCIETY.—Meeting Mar. 1st, Mr. B. Spencer in the chair.—Messrs. Firth and Hodgson exhibited several local insects, amongst which were *P. pilosaria*, *H. rupicapraria*, *H. progemmaria*, and *A. æscularia* (the two latter bred). Mr. H. T. Soppitt laid on the table a number of species of parasitic leaf-fungi, chiefly coniomycetes. The greater part of the evening was devoted to the exhibition of micro-

scopical objects. The chairman exhibited sections of *Osmunda* and *flix-mas*, thorn of rose, and a number of interesting slides of insects, crystals, &c. Mr. W. West, a number of interesting slides illustrating anatomy, entomology, and botany. Amongst the botanical exhibits of the latter were the archegonia of *Mnium punctatum*, and the characteristic utricles of *Sphagnum tenellum*. Mr. Faull, *Batrachospermum moniliforme* and scale mosses.

MEETING March 15th, Mr. J. Firth in the chair.—Mr. F. Richmond read an instructive paper on “Manure, and the Assimilation of Plants,” in which he described the various manures that were used by farmers, &c. In large towns great difficulty was experienced in disposing of night-soil; in some cases it was buried, and got rid of in other ways. The consequence was, a great loss was sustained. If it were taken on to the land, over and above the farmers’ manure, much better crops would be produced, as nightsoil was the best manure.—H. T. SOPPITT, Hon. Sec.

HUDDERSFIELD NATURALISTS’ SOCIETY.—Meeting 28th February, the president (Mr. C. P. Hobkirk) in the chair.—Mr. S. L. Mosley laid on the table a malformation of the egg of the domestic duck. The egg was shaped somewhat similar to an oval bulb, the thin end being so prolonged as to give it the appearance of having been affixed to the stem of some plant. Mr. Mosley drew attention to a number of different malformations both as to shape and colour, found in the eggs of domestic poultry and game, the eggs of many of our birds being entirely destitute of colouring matter whatever; others having the colouring on one end only, when it should be spread all over the egg; and, again, the colouring being at the small end when it should be at the opposite. He intimated that the members would do well to look into and try and find some solution for these differences. Mr. C. P. Hobkirk then laid on the table a number of mosses from the islands of Colonsay and Oransay, off the west coast of Scotland, viz., *Hypnum aduncum*, *molluscum*, *polygamum*, and *stellatum*; *Bryum pendulum* and *alpinum*, *Campylopus fragilis*, and var. *densus*, *Racomitrium aciculare*, and *Ulotia phyllantha*. Mr. Hobkirk then gave his lecture on “Some of the different Developments between Seeds and Spores,” explained and illustrated by diagrams.

MEETING 12th March, Mr. Joseph Tindall in the chair.—Messrs. J. Varley and G. H. Crowther laid on the table the following botanical specimens:—*Galanthus nivalis*, *Cardamine amara*, *Ficaria verna*, *Salix viminalis*, catkins of *Corylus avellana*, and *Betula alba*. In geology a specimen of *Sigillaria oculata*, by Mr. Varley. Mr. S. L. Mosley showed a number of beautiful drawings of birds’ eggs sent to him by Mr. Battersby, Rathowen, Ireland; they represent a number of different varieties of certain kinds of eggs. The following were among the number shown:—Sparrow hawk (*Accipiter nisus*), kestrel (*Falco tinnunculus*), sandpiper (*Tringoides hypoleucus*), dunlin (*Tringa alpina*), curlew (*Numenius arquatus*), landrail (*Crex pratensis*), nightjar (*Caprimulgus europæus*), hawfinch (*Coccothraustes vulgaris*), and the hooded crow (*Corvus cornix*).

These were of great interest to the members on account of the beautiful markings and different shapes of many of them. Mr. Varley laid on the table the stomach of the willow grouse, which was quite full of particles of twigs of the birch, thus showing to a certainty the kind of food they subsist upon. Mr. Varley then proceeded with his paper upon "The General Character and Structure of Birds," in which he noticed the differences of the lungs of birds and the mammalia, showed how the air is taken through the lungs into those hollow bones which in the mammalia and young birds are full of marrow, thus rendering the birds capable of being easily supported in the air, and many other points in their structure, well known to anatomical naturalists.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY. — Monthly meeting, February 28th, in the Free Library. — The president (Mr. S. J. Capper) read a letter he had received from Miss Ormerod, of Isleworth, which was accompanied by a copy of her "Notes of Observations on Injurious Insects, for 1880." The object of the work, he said, was the study of the life-history of certain insects injurious to our crops and fruit trees, so as to provide means for preventing their ravages. He was sure the members of the society who had not already assisted Miss Ormerod by their observations ought to do so. The number of insects selected for observation this year is thirty-two. He then called attention to a work, now in the press, by the same authoress, entitled "Manual of Remedies and means of prevention for the attack of insects on food crops, forest trees, and fruits." The work, which will be published at 3s., will be invaluable to farmers and producers. Mr. Nicholas Cooke read a paper entitled "Insect-Hunting in Scotland," in which he detailed his experience of many summer holidays spent in collecting insects in various parts of Scotland—illustrating his paper with two cases of Scotch insects compared with English representatives of the same species—among which was a fine series of *Crymodes exulis*, one of the rarest moths of Scotland. During the conversazione Lieut. Mason exhibited some butterflies and beetles collected in Africa.—J. W. ELLIS, Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION. — 414th meeting. Feb. 22nd, Mr. W. B. Turner, F.C.S., F.R.M.S., president, in the chair. — Lecture given by Mr. G. R. Vine, of Sheffield, on "The Carboniferous Limestone—the shores of an Ancient World."

415TH MEETING, March 1st, the president in the chair. — Shells from Holderness shown by Mr. W. E. Clarke; dragon-flies of various species by the president; and parasites of the tufted duck, ring ouzel, and house martin by Mr. F. Emsley.

416TH MEETING, Mar. 8th, the president in the chair. — Mr. Washington Teasdale, F.R.M.S., brought a fluid lens, made by Mr. Sellars of Birkenhead, whose system of cementing glass was excellent. Mr. Teasdale demonstrated that the graphoscope is in principle and effect the chromatic stereoscope of Brewster, and exhibited a variety of diagrams in illustra-

tion. On behalf of Mr. W. Grainge, of Harrogate, were exhibited a number of cryptogamic plants of various species, collected about that town. Mr. W. Atkinson showed the head of a four-horned Spanish sheep, bred at Tong Hall, near Leeds; also a slab of flexible sandstone. The president showed a great variety of marine algæ; Mr. J. W. Dixon, microphotographs; Mr. E. J. Ladmore, a section of mountain limestone from Denbigh, and one of oolite from North Ireland.

417TH MEETING, March 15th—The president, who was in the chair, exhibited a specimen of the deep-nosed pipe-fish (*Syphonostoma typhle*), taken off the Yorkshire coast. Mr. William Atkinson exhibited a large collection of marine algæ collected at Whitby, Scarborough, Filey, Flamborough Head, and Bridlington, including *Wormskioldia sanguinea*, *Porphyra laciniata*, *Dumontia filiformis*, *Cladophora areta*, *Laurencia pinnatifida*, and *Lomentaria ovalis*. Microscopical objects were shown by Messrs. F. Emsley and Washington Teasdale.—H. P.

WAKEFIELD NATURALISTS' AND PHILOSOPHICAL SOCIETY.—Fortnightly meeting, March 2nd, Mr. Wainwright, F.L.S., in the chair.—Mr. C. P. Hobkirk, F.L.S., Huddersfield, gave a lecture on "A Drop of Water." Mr. Hobkirk carefully considered the molecularity of water, and in the course of his lecture exhibited many useful and interesting experiments bearing upon the subject, showing, amongst other things, in a very scientific manner the marvellous effects produced by atmospheric agency upon ice and water, or the two combined. The origin, formation, structure, and final dissolution of glaciers was next dealt with, in illustration of which some very magnificent views were shown by means of the oxy-hydrogen lantern.

MEETING Mar. 9th, for the purpose of confirming the new rules and laws, it being intended to place the Society upon a permanent foundation, so that, when got fully into operation, much good work may be expected as the result. Dr. Crowther occupied the chair, and called upon the general secretary (Mr. E. B. Wrigglesworth) to read over and explain the proposed alterations, which, after some rather lively discussion, were passed in their entirety. The Society is about to inaugurate rambles and excursions, which will take place during the coming summer; for outdoor investigation in Natural History.

MEETING March 16th, Mr. Wainwright, F.L.S., in the chair.—A paper was read by Mr. John Spurling, Wakefield, on "The Fertilization of the *Salvia* and *Orchids*." The chief topics taken up in the paper were the structure and habits of the two orders. After the lecture, the members and public present were entertained to a series of microscopical exhibits of a very varied description, of which the following, amongst others, may be mentioned:—Trichini in human muscle, Mr. J. L. Chaplin; pollen from hollyhock; fern spores and pollen from *Eucharis*, Mr. Fletcher; *Polycystina* from Barbadoes, and some exceedingly interesting diatoms, Mr. Spurling; water animalcules and spiders, Mr. C. W. Richardson.—E. B. WRIGGLESWORTH.

Diary.—Meetings of Societies.

- April 4. Bradford Scientific Association.—Exhibition of Geological Specimens, 7-30 p.m.
- " 5. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections, 8 p.m.
- " 5. Liversedge Naturalists' Society.
- " 6. Bishop Auckland Naturalists' Field Club.
- " 6. Wakefield Naturalists' Society.—"British Ferns, their reproduction and classification," W. N. Cheesman, of Selby.
- " 7. Linnean Society of London, 8 p.m.
- " 8. Dewsbury Naturalists' Society.
- " 9. Huddersfield Naturalists' Society, 8 p.m.
- " 11. Bradford Scientific Association.—Paper by J. S. Colefax.
- " 12. Leeds Naturalists' Club, &c., Microscopical and Botanical Sections.
- " 12. Bradford Naturalists' Society.—"Geological Time," W. Jagger, 7-30 p.m.
- " 12. Barnsley Naturalists' Society.—"Structure and Habits of Fish," Dr. Lancaster.
- " 13. York and District Naturalists' Field Club.
- " 18. Easter Monday, Bank Holiday.—Yorkshire Naturalists' Union Excursion to Skipton.
- " 18. Manchester Cryptogamic Society, at Old Town Hall, King Street, 7-30 p.m.
- " 19. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
- " 20. Wakefield Naturalists' Society.—"Extinct Animals of Yorkshire," W. D. Roebuck, of Leeds, 7-45 p.m.
- " 21. Linnean Society of London.
- " 25. Huddersfield Naturalists' Society.—"Fertilization of Flowers," John Armitage.
- " 25. Lancashire and Cheshire Entomological Society.
- " 25. Bradford Scientific Association.—Microscopical Evening, H. T. Soppitt.
- " 26. Leeds Naturalists' Club, &c.—Lecture: "Notes on Modern Chromatics," Henry Pocklington, F.R.M.S.
- " 26. Bradford Naturalists' Society.—"Leguminous Plants," Mr. Faull.
- " 26. Barnsley Naturalists' Society.—"Sketches of Insect Economy," W. E. Brady.

To C. R., SHEFFIELD.—We cannot insert any anonymous communications. All articles and notes must be authenticated by the names and addresses of their authors, not necessarily for publication, but as a guarantee of good faith.
—Eds. *Nat.*

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of "The Birds of Yorkshire," by Mr. W. E. Clarke, M.B.O.U.; of an "Annotated List of the Land and Fresh-water Mollusca of Yorkshire," by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on "Yorkshire Macro-lepidoptera in 1877," by Mr. G. T. Porritt, F.L.S.; one on "Yorkshire Micro-lepidoptera in 1877," by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on "Yorkshire Diptera," and on the Yorkshire species of Hemiptera of the Family *Psyllidae*; and a report on Yorkshire Botany in 1877, by Dr. H. F. Parsons, F.G.S.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding"; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonidae*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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MAY, 1881.

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Original Articles.

ON YORKSHIRE BATS : AND ON THE PROBABILITY OF ADDITIONS BEING MADE TO THE LIST.

By W. DENISON ROEBUCK.

WHILE preparing my share of Mr. Clarke's and my forthcoming "Handbook of Yorkshire Vertebrates," I found that there was at least one specimen of bat absent from our list, which may very reasonably be expected to occur when looked for. While pointing this out, it may be of interest to take a general view of the present state of our knowledge of Yorkshire Chiroptera.

So far as at present recorded the list includes five out of fifteen bats known to inhabit Britain. These are—

- 1 *Plecotus auritus*, long-eared bat.
- 2 *Vesperugo noctula*, great bat.
- 3 *V. leisleri*, hairy-armed bat.
- 4 *V. pipistrellus*, common bat.
- 5 *Vespertilio nattereri*, reddish-gray bat.

Three of these are common, and the other two very rare, only being recorded in individual cases. I will treat of the five species in detail.

1. *Plecotus auritus* (L).

The long-eared bat, which ranges throughout England, Ireland, and Scotland, is widely distributed, and I believe very common throughout Yorkshire. In some places it is reported to be not so common as the Pipistrelle, as, for instance, at Huddersfield, and at Guisborough, in Cleveland. On the other hand, at Glaisdale, in Cleveland, it is reported as exceeding the Pipistrelle in numbers. So far as my own observations made near Harrogate are concerned, I have met with it oftener than I have met with the Pipistrelle; but I do not regard myself as able to say which is the more abundant of the two species.

2. *Vesperugo noctula* (Schreb).

The Noctula, or great bat, which is more solitary in its habits and flies higher in the air than the other bats, is specially interesting to us on account of its geographical range. As is the case with the nightingale, the northward range of this fine bat terminates—so far as it is known—in the county of York; and, like the nightingale, it is entirely absent from Scotland and Ireland; while throughout the whole area of Yorkshire, and of the midland, eastern and southern counties of England, it is generally distributed and of frequent occurrence.

The records of its Yorkshire distribution which are in my possession through the kindness of numerous correspondents, show that the *Noctule* is found as far to the north as Carperby, Masham, Keighley, Northallerton and Whitby; while it is not uncommon at Scarbro, Leeds, Harrogate, Tadcaster, Boston Spa, and Goole. It would be interesting if the naturalists of Durham and Northumberland would ascertain whether its range can be extended beyond the line of the Tees, which at present forms its northern boundary; while for Yorkshire naturalists only remains the task of filling up the blanks in the records of its range within the county.

3. *Vesperugo leisleri* (Kuhl).

The hairy-armed bat, which is known to inhabit the English shires of Warwick, Worcester, and Gloucester, and the Irish county of Armagh, is known for Yorkshire only by a single record. Mr. Edward Newman, in a series of "Collected Observations on British Bats," published in the *Field* for March 7, 1874, p. 218, remarked that Mr. Bond said that he had only seen three specimens of this species, all of which were taken from a chimney-shaft near Leeds.

4. *Vesperugo pipistrellus* (Schreb.)

The Pipistrelle, or common bat, is generally diffused and very abundant, not only in this county, but throughout the British Islands, extending even to the Outer Hebrides, and the Orkneys. There is no need to enter into any details as to its Yorkshire localities.

5. *Vespertilio nattereri* (Kuhl.)

The reddish-grey bat, which is widely distributed, though local, in England and Ireland, has only once been reported to occur in Scotland, and once in Yorkshire. Mr. Henry Denny, who published, in 1840, a catalogue of animals of the Leeds district, stated that of this species a living pair were brought him for the Museum of the Philosophical Society, in June of the preceding year (1839), which were taken out of an old tree in Oakwell Wood, near Birstall.

This completes the Yorkshire list; but it may be of service to consider what other species may be expected to occur. Of the ten remaining British species, two may be at once rejected as unlikely to occur, having each been admitted to the British list on the strength of a single individual being taken; *Vesperugo discolor* (Natterer), the parti-colored bat, and *Vespertilio murinus* (Schreb.), the mouse-colored bat. The former occurred at Plymouth, and the supposition is induced that it was most probably accidentally introduced in the rigging of a ship. The latter was taken in the gardens of the British Museum, in London, and this

instance, consequently, lies open to suspicion also. But it is remarkable that this species, which is pre-eminently the common bat of the European Continent, should be so entirely absent from Britain.

The accidental occurrences being weeded out, we have eight species left. Of these, we can hardly expect to meet with those species whose geographical range is restricted to the southern counties of England. This consideration deprives us of the expectation of adding to our fauna the two horseshoe bats (*Rhinolophus hipposideros* and *R. ferrum-equinum*), the serotine (*Vesperugo serotinus*), *Vespertilio dasycneme*, Bechstein's bat (*V. Bechsteinii*), and the whiskered bat (*V. mystacinus*). There then remain two species only to be looked for. The Barbastelle (*Synotus barbastellus*) which is very widely distributed in the southern and midland counties of England, reaches as far northwards as Cheshire and Norfolk, though it has never been reported for the north of England, nor for Scotland and Ireland. Possibly we may yet have the Barbastelle added to our county list.

There only remains one species to consider, and the whole practical outcome of this paper may be summed up in a sentence—that Daubenton's bat, *Vespertilio Daubentonii* Leissler,—ought to be found with us, judging from its known recorded distribution. It is very widely diffused over the whole of the British Isles, though perhaps rather local. Possibly it is overlooked from the great peculiarities of its habits and mode of feeding. In Bell's British Quadrupeds, 2nd ed., 1874, p. 61, we find its habits thus described :—

“ So peculiar are the vespertinal habits of this species, that, while very abundant, an ordinary observer might be quite unconscious of its existence. It is essentially an aquatic species, if such an expression be admissible, applied to an animal which never enters the water. It haunts that element continually, flying so near its surface as to render it difficult to distinguish between the creature itself and its reflection. The flight, quivering and slow, is performed by very slight but rapid strokes of the wings ; it may, indeed, be said to vibrate, rather than fly, over the surface of the water. It could not well fly in any other manner so near the surface without often striking it, and this it seldom, or perhaps never, does, although it often pauses to dip its nose into the water, whether to drink or pick up some floating food, we have been unable to ascertain. The Daubenton's Bat is, we suspect, rather an abundant species in the middle parts of England, * * *.”

This species thus appears a very likely one to occur in Yorkshire, especially as we learn from Alston's Catalogue of Scottish Mammalia that it has occurred in various Scottish localities and is pretty widely

distributed on the Scottish mainland, and also when we further learn it has occurred in the neighbouring county of Durham.

It would be of interest if our naturalists would keep a steady look-out for this interesting species during the coming summer, as from the above remarks it would in all probability be found.

Sunny Bank, Leeds,
April 5th, 1881.

INSECT-HUNTING IN SCOTLAND.

BY NICHOLAS COOKE.

(Concluded.)

In a meadow by the Spean we took great quantities of *Blandiata*, and on the low heathy ground were myriads of *Chærophyllata* and *Fumata*, a few *Thecla rubi*, and *Alexis*. We took forty-three species of Noctuæ here in ten days. Amongst the larvæ found here were *Trichiura cratægi* and *Pœcilocampa populi*. This locality abounded with insect life in greater profusion than any place I ever visited, and I doubt not that if it were properly worked, it would prove even more productive than the famed Rannoch ground.

In June, 1867, I again visited Inch, for the purpose of trying to find the nest of the snow-bunting, having seen a number of these birds the previous visit, on the summit of Ben-e-Bhean in breeding plumage, but was disappointed, as we did not find a single bird, though we ascended the mountain—nearly 4,000 feet in height—twice for this purpose. I added to my previous list *Cambricata*, *lunaria* and *silacea*.

On the 30th June, 1869, I visited Moy, and that night at sugar obtained my first specimen of *Exulis*. This locality is by no means as good a one for collecting insects as Roy Bridge, ten miles lower down Glen Spean, the number of species being very much fewer. There are, however, some good things to be met with, such as *Dictæoides*, *Myricæ*, *Intulenta*, var. *luneburgensis*, *Rectilinea*, *Vetusta*, *Conflua*, *Contigua*, *Festucæ*, *Leporina*, and *Epiphron*. *Furcatellus* abounds high up on Craig Maighaidh, with *Alpinalis*, *Eudorea alpina* and *gracilialis*; also *irriguana*. I once took a *Trepidaria*, but only one. The butterflies are few, *Davus*, *Pamphilus*, *Aglaia*, *Paphia*, *Alexis*, and *Urticæ* being all I have seen, except an occasional "white," probably *Rapæ*. *Tristata* is common on the moors, and *Hastata*, *ruficinctata*, *ericetata*, and *blandiata* also occurred amongst the sweet gale. Since 1869 I have visited Moy nearly every year, and have been out

there at all hours of the night and day, and never enjoyed the country so much as there. From the summit of the mountain there is the most extensive view of mountain-tops in every direction that it has been my lot to see. The entomologist may find plenty of occupation here, but I must confess it is the fishing, together with hope of obtaining *Exulis*, that has attracted me so much to the spot.

Why some of the Scotch varieties of lepidoptera should be darker in colour than English examples of the same species, and others lighter, is a mystery I have never heard satisfactorily explained ; and I have brought a small collection of Scotch contrasted with English specimens, as well as a few Continental ones, for your inspection. You will observe that *Festuca* and *Leporina* are lighter in colour than our specimens—the latter being almost perfectly white at Moy—whilst *Napi*, *Adusta*, *Polyodon*, *Orbona*, *Rurea*, *Glareosa*, *Impura*, *Dentina*, &c., are darker than ours. With regard to *Exulis*, I wish to add that sugar cannot be the proper way to take this species, though as yet I am not aware that it has been got in any other way, except perhaps a single specimen at rest in the daytime. I am convinced that it must be as common as most species if we only knew how it breeds, for it is spread over an extent of at least 200 miles from west to east, and probably exists on all the moors in the north of Scotland. There is nothing to prevent it from being common. If our variety is, as Dr. Staudinger pronounced it to be, only a variety of the species which he found abundant in Iceland, how is it that we cannot find it in the same way that he did ? It does not at Moy hang on the long grass at dusk as he says it does in Iceland, nor do the larvæ make galleries in the moss as he says they do, nor do they fly at the flowers in the daytime as he has seen them in Iceland. There is a flower—that of *Orchis maculata*—which is attractive to it by night, but I never saw it feeding that way, though I have collected the flowers in bunches and placed them in jugs of water in situations I thought likely to attract them when on the wing. How I know that they frequent this flower is, that I captured several with the pollen of it sticking to their palpi. The figure supposed to represent the larva which I have seen might have been a portrait of that of *Humuli*, so much is it like that species ; and I strongly suspect that some blunder has been made about this matter. I cannot believe that the larvæ of our *Exulis* will turn out to be similar to that of *Humuli*, and I hope to have the opportunity of hunting for the full-fed larvæ this spring. I have never been in Scotland when the larva could have been feeding, or, if it was hatched, they could not be large enough by the middle of September to catch the eye, if even they were feeding on the outside of blades of grass.

“My heart’s in the Highlands, wherever I go”—not chasing the wild deer, nor following the roe, but hunting for *Exulis*; and I still hope the life-history of this rich insect is reserved for me to find out. I kept the last one I took alive for eleven days (I caught her on the 26th August, 1879), to try to obtain eggs, but she laid none. I have not had more than three or four females altogether, and I never knew one to part with an egg.

I visited Loch Awe last August for a few days. All I saw at sugar were two or three *Fimbria* and a few *Polyodon*, some dark. By the side of the loch, about five miles up on the south side, I took about thirty *Medea* in bad condition at the edge of the wood. There were also a quantity of what I thought were *Napi*, flying in a meadow, and one *Aglaia*. In the wood were multitudes of common Geometræ. I also took by the shore of the loch a large ichneumon, *Trogus lutorius*, said to feed in larvæ of *Ocellatus* or *Atropos*.

With regard to localities that I have seen on my journeys, I think of all places I ever saw, the Trossachs surpasses every other in appearance as a collecting ground, but no doubt nearly all the head of Loch Lomond, as well as the foot of Loch Katrine, also the east side of Loch Tay, are grand hunting-grounds; as is also the country round Pitlochry and Dunkeld, and up the valley of the Tummel along the high road from Pitlochry to Kinloch-Rannoch, the happy hunting-ground of most collectors who have visited Scotland. Then again, on the west coast there is a fine collecting country round Oban, near which pretty little port *Nubigena* has been taken. Further north is Ballachulish, a magnificent bay, and in the neighbourhood is fine timber and nice ground as far as the entrance to Glencoe, at the other end of which is the great moor of Rannoch, twenty miles across.

The country round Forres also wants searching; there is fine timber near Sandhills like our own. The late Mr. E. C. Buxton told me that he had found sugaring most successful about some of the salt-water lochs in the far north, *Occulta* and other fine noctuæ being more abundant there than elsewhere, and he has seen a great part of Scotland and tried nearly every place he visited for insects, though his object was sport—principally fishing. The larva of *Alpina* is said to feed on *Vaccinium Myrtillus*, but not having met with the species myself, I can give no more information about it; and *Noctua sobrina* is another rarity which I have not met with, but which must have been bred in quantity, as it has been lately offered for threepence each. I should advise anyone ascending mountains for the purpose of collecting small things, to take up his setting case and stay and set all worth setting on the spot.

The disappointment of finding all your captures spoiled by the jolting of a deep descent, together with the heat of a summer's day (such as an entomologist delights in, for then his game is most plentiful), is very discouraging, whereas, had they been set on the spot there would be some pleasure in looking at them when brought home. I have seen *Crambus furcatellus* in countless numbers at an elevation of over 3,000 feet, and a lovely thing it is when just emerged from the pupa, but carry it down in a pill box on a hot day and it will not be worth a pin. *Ericellus* is on lower ground, but I never met with it in plenty. The *Epiphron* on Craig Maigdaith are the largest and brightest in colour of any I have seen. I have never paid much attention to Coleoptera when in Scotland, but have taken *Carabus glabratus* plentifully; also a pair of *Arvensis* at sugar, the only ones I ever met with, though I suppose it is regarded as a common species. In Diptera I have noticed the Tabanidæ in great abundance and variety, and very vicious in hot weather, but for the last two summers there have been very few flies of any kind, and last year bees were very scarce, so much so that the country people remarked to me that there were no bees in the heather bloom, although there was a profusion of flowers of all kinds. I never saw Scotland so gay with flowers as last August.

With regard to the peasantry of Scotland I may say that I have found them very honest, and I feel a degree of trust in them that I feel nowhere else; the only beings I fear in the Highlands at night are travelling tinkers and gipsies. Owls also have occasionally caused a funny sensation at the roots of my hair when their extraordinary noises were not expected. The Scotch are very reserved; it is difficult to get information out of them, and some are superstitious, perhaps those of Irish extraction, of which there are many near Roy Bridge, where we tried a moth trap, leaving it out all night on a wall where the light, unfortunately, shone across the village. Mr. Buxton came next morning from his fishing box, Corry Hoyle, to tell us that we had better shut up our moth traps, as the peasantry had got it into their heads that we were making signals for some purpose that would not be to their interest, and we should be mobbed if we persisted in showing the light at night. Again during the last summer I was sitting chatting with the mistress of the house out of doors at Moy (an old woman, upwards of 70 years of age), and she said, "Mr. Cooke, do you know that you are known about here as the ghost of Lochaber, and when your light is seen the people of Lochaber (a district of perhaps 150 square miles) dare not travel the road by night for fear of you?" I usually sugar along the highroad, putting it on the posts that mark

the road, in winter, when covered with snow, there being no trees near Moy. A lichen-covered stone is as good as any tree to sugar. Some things one would expect to find common on the Scotch moors are not so, *Davus*, *Quercus*, *Rubi*, and *Carpini* being met with only sparingly. The larvæ of *Quercus* are very large towards September, and the *Carpini* small compared with ours; this you may observe is the case with the specimens of the perfect insects in my box. The little collection of types which the box contains, will, I trust, prove of more interest than what I have read on the subject. I will only add that I believe any entomologist visiting the Highlands will wish to go again, and the probability is that if some of our young men would try some of the fresh localities I have named they would add species to our list. Dr. White, by going to new ground, has added two very conspicuous species, *Zygæna exulans* and *Sciaphila argentana*.

Gorsey Hey, Liscard, Feb. 19th, 1881.

Rainfall for March.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1881.	1880.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 4·59	16	8·96	* 7·74	5	0·85
HALIFAX... (F. G. S. Rawson)	360	6·53	15	12·98	8·78	..	...
WAKEFIELD (E. B. Wrigglesworth)	100	3·39	18	7·07	...	5	1·03
STANLEY..... (do.)	250	3·11	17	6·61	...	5	1·02
THORNES..... (do.)	90	3·49	16	...	...	5	1·17
BARNESLEY ... (T. Lister) ...	350	3·41	15	6·86	5·40	5	1·13
INGBIRCHWORTH (do.)	853	4·41	19	9·45	9·36	5	·92
WENTWORTH CASTLE (do.)...	520	4·14	16	8·43	6·56	5	1·18
GOOLE ... (J. HARRISON) ...	25	2·10	13	5·99	4·17	5	·86

* This is the average to date for 15 years, 1866-80.

Short Notes and Queries.

CUCKOO IN MARCH.—With reference to the paragraph about the cuckoo in your last number, I may state that a report was made to me by a resident at Goole that he had heard the bird (but had not seen it) about the 18th ult. I paid but little attention to it till I read your statement. —THOMAS BUNKER, 18th April, 1881.

GREAT-CRESTED GREBE, NEAR BRADFORD.—A specimen of the above-named bird was picked up alive, in an exhausted condition, at Shipley Glen, on the 19th of February last, and is now in the possession of Mr. W. Foulds, taxidermist, of Saltaire.—J. W. CARTER, Bradford, April 18th, 1881.

SPRING MIGRANTS AT RYBURN VALLEY.—I noted the arrival of the swallow on April 9th, willow wren on 11th, wheatear on moorland first week in April. I saw a pair of golden-crested wrens on March 25th, and they will no doubt nest in the district. Cuckoo and other migrants not arrived at time of writing.—F. G. S. RAWSON, Thorpe, Halifax, April 16th, 1881.

CURIOUS EGG.—Yesterday, one of my fowls, a black-red game hen, laid an enormous egg, which on being broken by myself, was found to contain another perfect egg of good average size in its centre. Has this ever been known to occur in the case of any wild bird?—GEO. T. PORRITT, April 20th, 1881.

Ichneumonidae AT YORK.—It may interest the members of the Yorkshire Naturalists' Union to know that the following species of *Ichneumonidae* have been taken mostly in this neighbourhood. They have been named for me by Messrs. Fitch and Bridgman :—*Ichneumon luctatorius* found in Edlington Wood, near Doncaster ; *I. trilineatus*, two examples by searching under bark of alder trees in Askham bog : all the remainder taken in this neighbourhood. *Paniscus cephalotes*, bred from pupa of *Dicranura vinula*, *P. testaceus*, flying round some hawthorn bushes, two specimens ; *Eurylabus dirus*, bred, but am not certain about its host ; *Euryproctus nigriceps*, four specimens, bred from cocoons of *Trichiosoma betuleti*, *Pimpla rufata*, *micum*, and *Stercorator*, captured at large ; *Platylabus pedatorius*, *Perilissus pallidus*, and *Exetastes osculatorius*, which I believe are new to the county ; *Mesoleius opticus* and *aulicus*, hovering above some willow stumps with larvæ and pupæ of *S. bembeciformis* in. These specimens came from the stumps, but whether from these larvæ or not I am not prepared to say. *Tryphon elongator*, *Lissonota sulphurifera*, and *Agrypon canaliculatum*, beat out of a hawthorn hedge in September, 1879. *Ophion minutus*, captured flying along a hedgerow. In the *Entomologist*, vol. xiii., page 54, Mr. Bridgman says of this species that it is new to the British list. This will, therefore, be the second British example. *Mesochorus confusus* I detected and caught whilst in the act of ovipositing on the larva of *Nematus ribesii* in 1880.—T. WILSON, Holgate, York, April, 1881.

YORKSHIRE NATURAL HISTORY.—The editors of the Entomologists' Monthly Magazine, in reviewing the Transactions of the Yorkshire Naturalists' Union, make some remarks which are worthy of reproduction. They say :—"The existence of such a multitude of Natural History Societies in a small district (for so Yorkshire is, notwithstanding it is our largest county), is probably an almost unique fact, and we believe we are

correct in stating that the majority of the members are of the artisan class. * * * * Those amongst "Britishers" who know the tastes of some of the better class amongst our artisans in the great industrial centres (of which Yorkshire is one) will be little surprised at finding Naturalists so abundant among them; to foreigners the fact must be a matter for some little astonishment. It was a happy idea to unite these Societies under a central governing body, and this latter, if wise, should use its position for educational purposes on broad principles, by impressing upon the members the necessity of recognising the fact that Yorkshire is not Britain, and that Britain is only an island in the northern seas."—(Vol. xiii., p. 143.)

MINING TERMS.—I am compiling for the English Dialect Society a glossary of mining terms, and shall be much obliged to any one who will help me by sending lists of terms actually in use in any district, or references to works in which such terms may be found.—JAMES BRITEN, Natural History Museum, South Kensington, S.W.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting April 12th, Mr. R. A. Kell in the chair.—A paper was read by Mr. George Griffiths, on "Observations and Adventures in North Wales." Notwithstanding the severe spring, several of our migrants from the south have been noted—the chiff-chaff March 18th, the wheatear 25th, by J. H. Salter, Ackworth School; swallows seen April 11th by Mr. H. Garland of Woodhall, house martin 17th, at Monk Bretton; same day, swallows reported by Mr. Hailstone, Walton Park; cuckoo seen April 14th at Cudworth, black-cap on the 14th. On April 4th Mr. Lister saw a carrion crow in the Dearne valley; the hooded crow is also reported from various parts. April 6th, three flocks of golden plovers seen on Cockerham-road near the town; April 12th, the tree pipit heard, and lapwings observed in great numbers in the Dearne valley. Mr. Salter saw the great-crested grebe and nine pochards at Hiendley dam on March 26.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Mar. 29th, the president (Mr. West) in the chair.—Mr. Foulds exhibited a fine specimen of the great-crested grebe, taken at Shipley Glen. The president read an instructive paper on "Algæ," describing the reproduction and classification of these low forms of vegetation.

MEETING April 12th, Mr. F. Richmond in the chair.—In the absence of Mr. Jagger, Mr. West gave a lecture on "Mosses," in which he thoroughly described this group of plants, and showed by sketches on the blackboard how to determine species not in fruit by their cell structure.

The classification and uses were dealt with, after which a general discussion took place. Messrs. Andrews and Soppitt described rambles they had recently made in the district. The chairman exhibited a number of exotic plants, which gave rise to a discussion on the structure of the flower.—H. S.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting, March 4th.—Mr. C. C. Hanson (who was in the chair) gave a list of the vertebrata of the neighbourhood, and Mr. J. E. Garside exhibited a pair of African spice birds, female grouse, and the egg of the glossy ibis. Mr. James Whiteley read a very interesting paper on "Volcanoes, active and extinct."—ALBT. FIELDING.

HUDDERSFIELD LITERARY AND SCIENTIFIC SOCIETY.—Annual Microscopical Soiree, 28th March. As usual, this was a marked success, about twenty microscopes being exhibited by the members to a numerous and fashionable gathering. In the course of the evening the president, Mr. Geo. Jarman, F.I.C., made a few remarks, describing some of the principal objects, amongst which the following may be mentioned:—By the president: sediment from Blackmoor-foot water, section of human lung injected, &c.; by Mr. C. P. Hobkirk, F.L.S., *Cetophilus septentrionalis*—a small entomostracan on which the whale feeds, head of East Indian mosquito, and lancet of common flea; by Mr. Geo. Brook, F.L.S., head of great gadfly, eye of cattle-fly, scales from elytron of diamond beetle, &c.; by Mr. Norman Porritt, human skin (wrist); by Councillor Byram Littlewood, circulation of blood and action of the heart in newly-hatched salmon, embryo of char in the egg; by Mr. G. T. Duthoit, *Trichina spiralis*, the pork parasite; by Messrs. Swindlehurst and Oakley, circulation in frog's foot and sting of humble bee; by Mr. G. W. Rhodes, spicules of Synapta, siliceous hairs on leaf of *Onosma taurica*, sections of agate, &c.; by Mr. H. G. Brierley, antennæ of cockchafer, male and female, and *Batrachospermum moniliforme*; by Mr. Hy. Young, *Volvox globator* (living), and many others.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting 28th March, Mr. S. L. Mosley in the chair.—Mr. F. Ellis showed four specimens of *Hybernia progemma*—three male and one female—and one male of the dark variety *fuscata*: Mr. G. Bickerdyke, a number of specimens caught during last summer, among them being the following:—*Agrotis vallisgera* from Lytham, *Polia flavocincta*, *Collix sparsata*, and *Cidaria immanata*. Mr. S. L. Mosley remarked that he had seen during the last week one of the first spring migrants—the wheatear.

MEETING 9th April, the president (Mr. C. P. Hobkirk, F.L.S.) in the chair.—Mr. Godward named the botanical specimens laid on the table by himself and Mr. Moorhouse, among which were *Polypodium vulgare*, *Veronica montana*, *Petasites alba*, *Chrysosplenium oppositifolium*, and other common species. In entomology Mr. Godward showed a specimen of

C. flavicornis from Roydhouse Wood, and Mr. S. L. Mosley one from Storths Hall, also *P. pilosaria* and *Xylophasia rurea*; the following by Mr. F. Ellis, *Cabera exanthemaria*, *Teniocampa gothica*, *T. stabilis*, and *Plusia chrysitis*, all local. Mr. Jas. Varley also showed some very good specimens of *Bombyx quercus*, var. *callunæ*, from Greetland Moor, among the number a dark variety common in Spain, but very scarce in England. Mr. S. L. Mosley said he had only seen three others of the same variety in England; he exhibited two cocoons of the saw-fly *Trichiosoma betuleti*. Mr. Mosley then proceeded with his lecture on "British Birds."

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting March 28th, Mr. S. J. Capper (president) in the chair. Walker's "Diptera Britannica," and Staveley's "British spiders" were promised as donations to the library, the former by the Rev. H. H. Higgins, and the latter by Mr. Weightman. Mr. C. H. H. Walker then read a paper on the *Ichneumonidæ*, referring to the great number of British species of this family of insects, and describing the anatomy of a typical species, illustrating his remarks with well executed drawings. He described the manner in which the female insect laid her egg in or upon the bodies of the caterpillars of butterflies, moths, or flies—the eggs hatching and the ichneumon grubs feeding inside the body of their host until they kill the caterpillar—when they leave the dead skin and spin their cocoons, from which the perfect insect emerges in a short time to carry on the work of destroying the enemies of our vegetable crops. During the conversazione which followed Mr. Walker exhibited a case of ichneumons to illustrate his paper, Mr. Wall specimens of living insects under the microscope, and the secretary living larva of *Agrotis porphyrea* taken at Bidston, and beetles collected during the last fortnight on the New Brighton sandhills.—J. W. ELLIS, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—418th meeting, March 22nd.—Chair occupied by the president (Mr. W. Barwell Turner, F.C.S., F.R.M.S.), who showed parasites, including *Eoinocotes comfar* from the turtle dove; *E. hologaster* from the common fowl; *Hæmatopinus quadrumanis* from the monkey; and *Trichodectes subrostratus* from the cat, the latter being very rare, Mr. Denny never having met with it. Mr. F. Emsley showed diatomaceæ, comparing the markings as shown by Gundlach's one-eighth objective with those shown by Field's one-sixth. Amongst the slides brought by Mr. Washington Teasdale were several illustrative of cryptogamic botany, preserved by Mr. Cheesman, of Selby.

419TH MEETING, April 2nd, was a very successful conversazione and exhibition in the Albert Hall.

420TH MEETING, April 5th, the president in the chair.—Mr. Wm. Denison Roebuck read a paper on Yorkshire Bats (see page 145), and exhibited specimens. These included the great bat, or Noctule, from

Masham and Carperby, and the Pipistrelle, or common bat, from Masham. Mr. Walter Raine showed a long-eared bat from Ryther, and read an interesting note on its habits in captivity; he also showed (in the flesh) a fine squirrel in winter dress from Ryther. A note by Mr. H. G. Faber, relative to the black rat at Stockton-on-Tees was read, whereby it appeared that it was not quite so scarce there as had been reported. Mr. Roebuck showed a photograph of the rough-legged buzzard captured in 1876 at Kilburn, N. Yorks., and now in Mr. J. Edson's collection. A note by Mr. T. H. Nelson, of Bishop Auckland, on the former abundance of seals at the mouth of the Tees, was read; also a query from Mr. Foster, of Sancton, as to the cause of twigs of Scotch fir dropping to the ground. No explanation was arrived at. Microscopic objects were shown, and Mr. Henry Marsh showed lepidoptera of recent capture.

421ST MEETING, April 12th, the president in the chair.—He showed a series of spines of star-fish, including those of *Luidia fragilissima* from Aberdeen; of *Asterias vulgaris* and *Uraster rubens* from Flamborough Head; and *Ophiocoma neglecta* from Devon. Mr. F. Emsley brought a quantity of diatoms and desmids from Weetwood, amongst which were a considerable number of *Meridion circulare*; Mr. W. Teasdale showed crystalline forms of the aromatic bodies derived from coal tar by Dr. Otto N. Witt, who used the German nomenclature of chemical substances, *Mononitrodiphenylnitrosamine* being a sample of the result. Mr. J. W. Dixon showed eggs of lepidoptera, and Mr. C. R. Newton *Trichina spiralis* from diseased pork and human muscle; Mr. Roebuck showed shells and plants collected at Masham by Mr. Carter.—H. P.

MANCHESTER CRYPTOGAMIC SOCIETY.—Monthly meeting, March 21st, Dr. Carrington, F.R.S.Ed., in the chair.—The principal part of the evening was devoted to the subject of "Ferns," Mr. Foster having brought a very large series of dried ferns, beautifully mounted. The greater number were abnormal forms of British species, and the extreme variations shown were a source of interest to those who took a special interest in this class of cryptogams. A collection of the ferns of Madeira, which had lately been presented to the Free Reference Library by the executors of the late John Windsor, F.L.S., was partially examined by the members present. The Hon. Sec. (T. Rogers) called the attention of the members to a series of microscopic slides which he had brought, showing the prothallus of ferns in various stages of development, some showing the sperm cells, and others the perfected young plants. Two slides showed the germination of the spores of *Hymenophyllum* while still *in situ* in their bi-labial indusium. Other slides showed the germination of young ferns direct from the spore receptacles on the veinlets of the pinnules of *Adiantum capillis-veneris*. In some cases these could be seen under the perfected indusium, whilst in others the indusium was imperfect and rudimentary. Mr. W. H. Pearson exhibited specimens

and drawings of a hepatic new to Britain—*Jungermannia Juratzkana* (Limpricht), which he had detected in a collection made by Mr. West of Bradford, last year, when on Ben Lawers. Mr. Pearson also read a translation of a paper by G. Limpricht on *Gymnomitrium adustum*, in which he clearly establishes the fact of a true *Gymnomitrium adustum* (Nees.) He therefore alters the name of *Sarcoscyphus adustus* (Spruce) to *Sarcoscyphus Sprucii* (Limpricht). Specimens and drawings of the two species were afterwards shown. Mr. Pearson exhibited specimens of the new *Radula commutata* (Gottsche), which had been collected by Mr. C. J. Wild, in the same locality, as previously mentioned at the last meeting.—T. ROGERS, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—Meeting, March 26th.—The president (Mr. James Spencer) exhibited a series of interesting microscopical sections of coal plants, including another new sporangium. It is about the same size and form as the one shown at the last meeting, containing *Zygosporites brevipes*. The present one contains microspores of a most peculiar form; they are shaped almost like a cockle shell, and very much smaller than *Zygosporites brevipes*. At the first glance they look like a miniature copy of the large fringed microspores so common in our coal balls, but upon closer inspection they are seen to be of a more decidedly triangular form, and the fringe, of extremely delicate hair, is chiefly confined to what may be termed the base of the triangle, or mouth of the spore. The spores are arranged in groups, each group containing four spores, hence their name of tetraspores. Some idea may be formed of their minuteness from the fact that the sporangium or "bag" which contains them is only about the one hundredth part of an inch in breadth by about the thirty-fifth part of an inch in length, and yet it contained many hundreds of spores. He also exhibited the fossil fungus *Peronosporites antiquarius* in several coal plants, and, for comparison, sections of the recent pine (*Pinus sylvestris*) containing fungus mycelium. The wheat-ear was heard in Ovenden on the 20th March, and a kittiwake was found dead in Shroggs Wood on the 22nd.

MEETING, April 11th.—A lecture on "The Fossil Flora of the Coal-measure" was given by Mr. James Spencer, illustrated by specimens of plants from the splendid collection of the Society's Museum, and by a large series of diagrams illustrative of the various fossil plants, shewing their internal structure, found by the lecturer in the coal strata of the district.

YORKSHIRE NATURALISTS' UNION.—The inaugural excursion of the present season took place in the West Riding, at Skipton, on Easter Monday, the 18th of April. In addition to the immediate vicinity of the place of meeting—the Church, the Castle and its woods,—the following localities were visited and explored by the members:—Barnoldswick, Gisburn, Elslack, Thornton, Draughton, and Cracoe. Geological parties were arranged and successfully led by Mr. Jones, the local secretary for

the meeting. The day was very favourable, the bright sunshine doing much to counteract the effects of a cold east wind. A most enjoyable day was spent. The meetings were held at the Devonshire Hotel, where about forty members partook of tea. At the general meeting the number of members was considerably augmented, and in all between fifty and sixty members were present, representing eleven of the incorporated Societies. The chair was filled by Mr. Wm. Cash, F.G.S., of Halifax. The minutes having been read and confirmed, the Keighley Scientific and Literary Society was admitted into the Union on the motion of Mr. Jones, seconded by Mr. Roebuck. A list of new subscribers, ten in number, was read to the meeting, and a vote of thanks recorded. Votes of thanks were then presented to the local secretary for the able manner in which he had arranged for the meeting; to the donors of several valuable acquisitions to the library; to Mr. Ross, the agent for Sir H. J. Tufton, and to Mr. Dewhirst, for permission to ramble on their estates. The Sectional Reports were then given as follows:—Mr. Wm. Eagle Clarke, for vertebrate zoology, stated that in a walk from Barnoldswick to Gisburn and back, twenty-three species of resident birds had been observed, including local species of the northern type, such as the dipper, grey wagtail, and curlew; six summer visitants, the redstart, willow-wren, swallow, sand-martin, white wagtail, and pied flycatcher—the last two being most interesting observations; the white wagtail having been recorded on very few occasions in the county; whilst Ribblesdale (Yorkshire) is a new locality for the extremely local pied flycatcher. Mr. Wm. Cash, for conchological section, reported eleven species (freshwater), viz., *Sphærium corneum*, *Bithinia tentaculata*, *Valvata piscinalis*, *Limnæa peregra*, *L. palustris*, *L. truncatula*, *Succinea gracilis*, *Planorbis contortus*, *P. vortex*, *Physa fontinalis*, and *Ancylus fluviatilis*—all at Gisburn; also twenty-two land species, viz., *Vittrina pellucida*, *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*, *Z. crystallinus*, *Z. purus*, *Z. nitidus*, *Helix hispida*, *H. caperata*, *H. arbustorum*, and *H. rufescens*, in woods near Skipton Castle; *H. rupestris* at Draughton; *H. nemoralis*, *H. rotundata*, *Clausilia laminata*, *C. rugosa*, *C. rugosa. var. dubia*, *Cochlicopa tridens*, *C. lubrica*, and *Pupa umbilicata*, obtained near Skipton Castle; *Balea perversa* at Draughton; and *Corychium minimum*, also near Skipton Castle. In the entomological section Mr. G. T. Porritt reported that the prolonged winter had retarded vegetation, and consequently there were but few insects. A few species in the various orders had been taken, but none worthy of special note. Mr. W. West reported for the botanical section. The localities visited were the immediate vicinity of Skipton, and the district about Elslack, Thornton, Barnoldswick, and Gisburn. The season being very backward, only 184 species of vascular plants were noted, *Ranunculus Lenormandi*, *Viola hirta*, *Nuphar lutea*, and *Primula farinosa* being among the rarer ones collected. A large number of mosses were collected, fifty species being recognised at the meeting; *Brachythecium rivulare*, *Eurhynchium*

piliferum, *Hypnum chrysophyllum*, and *Antitrichia curtispindula* being amongst them. Four common species of *Hepaticæ* were collected. Eight species of lichens were gathered, none of them being rare. Sixteen species of fungi were seen, including *Sphæria sperinoides*, *Hysterium pulicare*, *Peziza stercorea*, and *Puccinia adoxæ*. A number of algæ were collected, *Gomphonema olivaceum*, *Cymbella gastroides*, *Mougea genueflexa*, *Closterium lunula*, *Fragilaria virescens*, *Meridion circulare*, *Synedra splendens*, and *Pinnularia viridis* being amongst them. For the geological section Mr. T. W. Bell reported. This section was divided into three parties. Those who arrived at Skipton by the earlier trains proceeded direct to Thorpe; of the later arrivals some went to examine the limestone strata at Cracoe; while others decided to see the Skipton Rock at Skipton and Draughton. The boss of limestone known as the "Skipton Rock," is a portion of an extensive system of anticlinals developed in the mountain limestone of the Craven district, and forms a low range of hills extending from Skipton to Bolton Abbey. The members who went over this district report that at Skipton and Draughton large portions of this anticlinal are exposed in section, and show the strata dipping at various angles, and in some places contorted in a most remarkable manner. On the north side of the Skipton Rock, and presenting a bold escarpment towards it, rises a hill known as "Embsay Crag." This crag is capped by the lower portion of the millstone grit, and the valley between it and the "Rock" is occupied by rocks of the Yoredale series. Sections of these rocks were seen on the Cracoe-road, in the beds of numerous small streams that traverse the district. At Cracoe and Thorpe, the main mass of the upper mountain limestone is again met with, its position at these places probably being due to a large fault which extends from Malham Tarn towards Grassington. The limestone at Thorpe is exceedingly fossiliferous, and some good specimens have been obtained. Mr. J. W. Davis here secured a fine specimen of *Spirifera*, having the outer portion broken away and showing the internal spiral arrangement beautifully preserved. At Cracoe the strata exposed at the base of the quarries do not seem to contain many fossils, but in the higher beds they are fairly numerous. The party visiting this district found some very good fossil specimens, also several concretionary nodules filled with fine pyramidal crystals of calc spar. In the short time at the disposal of the sectional meeting it was impossible to determine all the species with accuracy; but the following list will give an indication of what was collected;—**CEPHALOPODA**: *Nautilus*, *Goniatites*, and *Orthoceras*; **GASTEROPODA**: *Pleurotomaria*, *Euomphalus*, *Belerophon*, *Buccineum* (?); **BRACHIOPODA**: *Terebratula hastata*, *Spirifera glabra*, *S.* ——— sp. (?) *Productus gigantea*, *P. striata*, *P. semireticularis*, *P.* ——— sp. (?), *Orthis resupinata*, *Rhynchonella*, sp. (?) Of **CONCHIFERA** several specimens were found, but none sufficiently perfect for identification. Portions of encrinites were abundant, and several fossil corals were collected. A vote of thanks to the chairman closed the meeting.—WM. EAGLE CLARKE.

- May 3. Leeds Naturalists' Club, &c. — Microscopical and Botanical Sections, 8 p.m.
- " 3. Liversedge Naturalists' Society.
- " 3. Bishop Auckland Naturalists' Field Club.
- " 4. Wakefield Naturalists' Society.—Paper by Mr. J. L. Chaplin, 7-45 p.m.
- " 5. Linnean Society of London, 8 p.m.
- " 7. Huddersfield Naturalists' Society. 8 p.m.
- " 10. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
- " 10. Bradford Naturalists' Society.—Paper by Mr. A. E. Benney, 7-30 p.m.
- " 11. York and District Naturalists' Field Club.
- " 13. Dewsbury Naturalists' Society.
- " 14. Yorkshire Naturalists' Union.—Excursion to Sheffield, for the Rivelin Valley. Local Sec., Mr. J. C. Burrell, King Street, Sheffield.
- " 16. Manchester Cryptogamic Society, at Old Town Hall, King Street, 7-30 p.m.
- " 17. Leeds Naturalists' Club, &c. — Microscopical and Botanical Sections.
- " 20. North Staffordshire Naturalists' Field Club.—Excursion to Cloud Hill. Leader—Mr. Goss.
- " 23. Huddersfield Naturalists' Society.— Paper "The Ant," by G. P. Stather.
- " 24. Linnean Society of London.—Anniversary Meeting, 3 p.m.
- " 24. Leeds Naturalists' Club, &c.—Entomological and Vertebrate Sections.
- " 24. Bradford Naturalists' Society.—Paper by Mr. B. Spencer.
- " 30. Lancashire and Cheshire Entomological Society.
- " 31. Leeds Naturalists' Club, &c.—Lecture "The Island of Rodrigues and its Fauna, as they were and as they are," by H. H. Slater, B.A., F.L.S., of Ripon, late Naturalist to H. M. Transit of Venus Expedition to Rodrigues, 1874.

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Original Articles.

ON THE METHODS OF MICROSCOPICAL RESEARCH IN USE IN THE NAPLES AQUARIUM.

SUMMARY (By GEO. BROOK, F L.S.) OF A PAPER BY DR. PAUL MAYER, IN THE "MITTHEILUNGEN A. D. ZOOLOG. STATION, ZU NEAPEL," VOL. 2, PART 1, 1880.

DR. DOHRN's Geological station at Naples, including as it does every facility for dredging and studying marine forms, has commenced a new era in the study of marine biology which cannot be too closely imitated in this country. The methods employed in this establishment in preserving the objects to be studied, the various processes by which they are stained, mounted, &c., cannot fail to be of interest to every working microscopist, for although the methods here enumerated are only mentioned in connection with marine forms, they are as a rule equally applicable to fresh-water organisms, insects, &c. It is for this reason that I have ventured to lay before the readers of the *Naturalist* a summary of Dr. Mayer's paper.

PRESERVATIVE METHODS.

Picrosulphuric Acid.—First in importance as a preservative medium, and one which is now becoming most generally used, is picrosulphuric acid. Kleinenberg's formula for preparing it is as follows :—

100 parts cold saturated solution of picric acid in water ;
2 „ strong sulphuric acid.

The liquid, when filtered and diluted with three times its bulk of water, is ready for use. For *Arthropoda* Dr. Mayer uses the acid undiluted.

One of its greatest advantages is that it supplants the water in the animal's body, as well as that adhering to its outer surface by a liquid which, after having done its work, allows itself to be entirely replaced by alcohol. With osmic and chromic solutions, it is well known this is not the case. They also produce an inorganic precipitate in the tissues of the objects which prevents proper staining afterwards. With picro-sulphuric acid it is necessary to use plenty of the liquid, particularly for objects with a large body cavity, which it is necessary to preserve whole. It penetrates with difficulty through thick *chitine*, though even in this respect it is preferable to other media. With the larger objects it is indispensable to open the body its whole length with a pair of scissors, and by means of a

pipette to inject it full of the acid. Time should not be given for the blood to coagulate and fasten the organs together, nor should the object be allowed to remain for any length of time in a turbid liquid. Too much stress cannot be laid on this simple rule, for in its non-observance lies the occasion of so many unsatisfactory results. How long an object ought to remain in the acid depends greatly on its nature. Usually a few hours is sufficient, but for large objects, and those containing a large per-centage of water, a longer time is necessary, and also an occasional stirring up or change of liquid. Often, if left in the acid a whole day, the objects appear to sustain no injury. While in chromic acid the tissues are apt to become too brittle unless taken out in time, in picrosulphuric acid there is a certain death to the cells, but no true hardening. In cases where carbonate of lime, in the form of gypsum, forms a part of the animal structure, this would be acted on by the sulphuric acid, and there would be a softening rather than a hardening of the whole structure. When the objects have remained a sufficient time in the acid, they should be transferred to 70 % alcohol. As long as any colour is given to the alcohol it must be continually changed, for until every trace of picric acid has been removed the object will not stain properly. This is often a tedious process, and requires long washing and continuous stirring up of the liquid. Small objects may be conveniently placed under the microscope to see if any tinge of the yellow picric acid remains. When every trace of colour has been dissolved out, the preservative process is complete, and the objects may be kept in 90 % alcohol for further study.

Picro-sulphuric acid must not be used for animals containing carbonate of lime, where that is desired to be preserved. For example, in Echinoderms the carbonate of lime is dissolved by the picrosulphuric acid, and then thrown down as crystals of gypsum in the tissues. In its use with vertebrates it must always be borne in mind that the acid swells up the connective tissues. Prof. Emery finds this process very useful for embryos of vertebrates and for fishes, but they should not be allowed to remain in the acid more than three or four hours. Kleinenberg has recently used creosote made from beechwood tar along with the acid, to avoid the swelling-up of the tissues, with very fair results. Although this method is considerably the best for preserving Crustacea as a rule, it will not do at all for the parasitic species. It causes the object to swell up to such an extent as often to rupture the walls. In order to avoid the deposition of gypsum crystals in those objects containing carbonate

of lime, hydrochloric acid or nitric acid, in place of sulphuric acid, has been used with good results. The mode of preparation is as follows :—

100 parts sat. sol. picric acid in water.

8 „ hydrochloric acid containing 25 % H Cl.

or, in place of the 8 parts hydrochloric acid, 5 parts pure nitric acid of 45 % N_2O_5 may be used. These solutions act in most respects like the picro-sulphuric acid, but the picric acid is not quite so easily withdrawn by alcohol.

Alcohol.—In a certain antithesis to the working of picrosulphuric acid stands that of alcohol. The latter causes in thick walled objects, particularly in those which are chitinous, a more or less marked maceration of the interior of the object, which presently begins to decay. Again, strong alcohol fixes the salt of the externally adhering sea-water on the walls of the object, and so hinders a proper penetration of the liquid. Afterwards when the object is required to be stained, unless an aqueous solution of the staining medium is used, by which the precipitated sea-salt would be again dissolved, a proper staining of the interior cannot be obtained. In staining with cochineal it appears that in consequence of the existence of sea-salt crystals on the outside of the object, a grey green precipitate is thrown down which often spreads over the whole object and makes it unfit for use. This may, however, be avoided to a great extent by first soaking the object for a few hours in *acid alcohol* (1-10 parts hydrochloric acid to 100 parts of 70 % alcohol). From what has been said it will be seen that alcohol *per se* is not a desirable preservative medium, at least for objects which are intended for histological research.

Acid Alcohol.—In order to avoid the maceration caused by ordinary alcohol Dr. Mayer has tried a slight addition of Hydrochloric or nitric acid to alcohol of 70 %, also to alcohol of 90 % with good results. He finds the best proportion to be 3 of hydrochloric acid to 97 of 90 % alcohol. The object should only be allowed to remain in the liquid until it has become thoroughly soaked through and then transferred to pure 90 % alcohol. In order to ascertain how far the process has gone, a little picric acid is dissolved in the liquid so that on subsequent washing in clean alcohol the yellow colouring matter shows how far the alcohol has penetrated. In the use of acid alcohol

it must be remembered that the liquid after some time loses its properties and at the expense of the hydrochloric acid, builds up ether compounds.

Boiling Alcohol.—In some cases amongst the *Arthropoda* it is almost impossible, with the ordinary methods in use, to kill as quickly as necessary. In these cases Dr. Mayer has used boiling absolute alcohol which kills instantly, as for instance in the *Tracheata*.

Osmic Acid.—Dr. Mayer's experience of the use of osmic acid is not very satisfactory, and he now seldom uses it at all excepting when such objects as hair, bristles, &c., are to be stained to show the histological details. Without doubt one of the best objects to stain by this means is *Phronima sedentaria* when every cell and nucleus comes out most beautifully. According to Emery the yellow and red fatty pigments of fishes can be better stained by osmic acid than by any other means. The great drawback to the use of osmic acid is that the preparations are very liable to get overstained, and thus a precipitate is formed which interferes with the working of the subsequent staining medium, for instance carmine or picro-carmine. There is, however, no difficulty in removing the osmic acid again provided the object be at once immersed in 70 or 90 % alcohol. Enough crystals of common salt are shaken into the liquid to cover the bottom of the vessel and then with a pipette a few drops of hydrochloric acid are added until by stirring the liquid it is seen that chlorine is being generated. This is easily recognised by its yellow-green colour. If the bleaching solution is placed on a water bath the process is considerably accelerated. Dr. Mayer has found that in half-a-day he has been able to restore large *Pelagia*, *Carinia*, *Rhizostoma*, &c., so that practically they were as good as ever. The objects then require to be kept in pure alcohol again and the liquid will require changing a few times to get rid of the smell of the chlorine. This process of bleaching may also be used in getting rid of natural pigments, as for instance in the eyes of insects and Crustacea, but in these cases it is better first to cut the sections and afterwards to bleach them, so that the chlorine gets a better chance of acting on the pigments.

Chromic Acid.—In the Zoological station at Naples, chromic acid is now little used for invertebrates, as it has all the disadvantages of osmic acid without possessing its advantages. It is, however, frequently made use of, along with Kleinenberg's acid, where the

tissues are required to be hardened more than the latter would do it alone.

Dr. Lang's Medium.—Dr. Lang was induced by an old paper of Blanchard's to work with corrosive sublimate, to which he added acetic acid or picrosulphuric acid. The original prescription is as follows :—

100 parts distilled water.
 6–10 „ common salt.
 5–8 „ acetic acid.
 3–12 „ corrosive sublimate.
 and ultimately $\frac{1}{2}$ part alum.

The Planarians, for which this medium was intended, are laid on their backs and freed as much as possible from water, and the mixture is then poured over them. They then die fully extended. In half-an-hour they are placed in alcohol of 70 %, then in 90 %, and finally in 100 % alcohol, and in two days they are quite hardened. Later Dr. Lang has used a saturated solution of corrosive sublimate in picrosulphuric acid with 5 % acetic acid added; or simply a saturated solution of corrosive sublimate in water. In cases where it is difficult to kill the object sufficiently quickly, the liquid must be used boiling. According to the researches of Lang and others, this medium is very useful for hydroids, corals, small *Ctenophores*, some *Gephyrea* and *Balanoglossus*, *Echinoderms*, *Sagitta*, many annelids, and for *Rhabdocœla*. *Dendrocœla* should only be preserved by this method when wanted for histological purposes. To the foregoing may be added *Cestoda*, *Trematoda*, and larvæ of *Turbellaria*. As a rule *Planarians* killed by this method should not remain more than a few days in alcohol, as they become very brittle. It is better to stain them at once and imbed in paraffine ready for section cutting, where they may remain for a considerable time. With the *Arthropoda* Dr. Mayer has not been able to obtain good results by this method.

Prof. Merkel's Medium.—This consists of a solution of one part each of platinum chloride, and chromic acid in 800 parts of water. Dr. Eisig has obtained very good results by this method with annelids, and thinks that as a rule four to six hours is a sufficient time for the objects to remain in the medium. After further treatment with alcohol, the objects stain splendidly.

(To be continued.)

YORKSHIRE NATURALISTS' UNION.—CRYPTOGAMIC
REPORT FOR 1880.

BY WM. WEST, CRYPTOGRAMIC SECRETARY.

(Continued.)

[CORRECTION.—The localities given for *Seligeria pusilla* apply to *S. recurvata*, the localities which ought to have followed *S. pusilla* being Gaping Ghyll, Ingleborough, and Hesletine Ghyll, Pen-yghent. *J. exsecta*, we unfortunately wrote instead of *J. incisa*.]

Explanation of initials—G. E. M., G. E. Massee; H. T. S., H. T. Soppitt; W. W., W. West.

LICHENS.

THIS family seems to be more neglected than any other, and we believe that the chief reason is because there are few of this group of plants to be found near our large smoky towns, where most of our botanists reside. There is plenty of good work to be yet done in Yorkshire, in this family, therefore let us hope that something may be done this year by those members who may have opportunity.

Sphærophoron coralloides, Pers. Forge Valley, near Scarborough, G. E. M.

Baeomyces rufus, D. C. Plumpton, F. A. Lees; near Harrogate, T. Hick.

Stereocaulon coralloides, Fr. Forge Valley, near Scarborough, G. E. M.

Cladonia pyxidata, var. *finbriata*, Hoffm. Seamer Moor, G. E. M.

C. difformis, Hoffm. Hackness, G. E. M.

C. cervicornis, Schær. Hackness, G. E. M.

C. gracilis, Hoffm. Scarborough, G. E. M.

C. squamosa, Hoffm. Scarborough, G. E. M.

Evernia prunastri, Ach. Scarborough, G. E. M.

Cetraria aculeata, Fr. forma typica. Bingley, W. W.

Peltigera canina, L. Castle Howard, G. E. M.

Solorina saccata, L. Whernside, at the source of Great Blake Ghyll, W. W.

Ph. scia obscura, Ehrh., var. *viarella*, Ach. Scarborough, G. E. M.

Physcia stellaris, L., var. *tenella*, Scop. Malham, W. W.

Umbilicaria polyrrhiza, L. Harden Moor, W. W.

Lecanora rubra, Hoffm. Scarborough, G. E. M.

Lecideia contigua, Fr. Bingley, W. W.

Endocarpon miniatum, L. Clapham, W. W.; Castle Howard, G. E. M.

E. fluviatile, D. C. Cawtley Spout, W. W.
Verrucaria nitida, Weig. Scarborough, G. E. M.

FUNGI.

As in last year's list, so in this, are we indebted for the bulk of the records to Mr. G. E. Massee, of Scarborough. We have placed those species which are indexed under *Agaricus* in Cooke's Handbook, under that genus, for facility of reference, and not mentioned the sub-genera.

Agaricus rutilans, Schæff. Scarborough, G. E. M.
A. spissus, Fr. Scarborough, G. E. M.
A. mollis, Sch. King's Causeway, near Goole, T. Birks.
A. campestris, L., var. *rufescens*, Berk. Whitgift, near Goole, T. Birks.
A. fusipes, Bull. Nab Wood, Bingley, H. T. S.
A. tuberosus, Bull. Bolton Woods, H. T. S.
A. candicans, Fr. Heaton, H. T. S.
A. opacus, With. Shipley Glen, H. T. S.
A. odoratus, Bull. Horton in Ribblesdale, H. T. S.
A. squarrosus, Mull. Bolton Woods, H. T. S.
A. separatus, L. Heaton, H. T. S.; Scarborough, G. E. M.
A. campanulatus, L. Scarborough, G. E. M.
A. bellus, Fr. Scarborough, G. E. M.
A. ostreatus, Jacq. Esholt, H. T. S.

The following, all from Scarborough, by G. E. M.:—*Agaricus paludosus*, F.; *A. embolus*, Fr.; *A. fœniseii*, Pers.; *A. papilionaceus*, Bull.; *A. rubescens*, Pers.; *A. purus*, Pers.; *A. stellatus*, Sow.; *A. polystictus*, B.; *A. galopus*, Schrad.; *A. griseus*, Fr.; *A. sericeus*, Bull.; *A. filipes*, Bull.; *A. sulfureus*, Bull.; *A. fastigiatus*, Fr.; *A. radicans*, Relb.; *A. vitilis*, Fr.; *A. galericulatus*, Scop.; *A. vaginatus*, Bull.; *A. crassifolius*, Berk.; *A. fucatus*, Fr.; *A. melleus*, Vahl.; *A. ocellatus*, Fr.; *A. tener*, Schæff.; *A. alcalinus*, Fr.; *A. albocyaneus*, Desm.; *A. grammopodius*, Bull.; *A. cirrhatus*, Schum.; *A. pelliculosus*, Fr.
A. capillaris, Schum. Castle Howard, G. E. M.
A. pyxidatus, Bull. Scarborough, Terrington Peat Carr, G. E. M.
A. tenerrimus, Berk. Castle Howard, G. E. M.
A. gracilis, Fr. Scarborough, G. E. M.
Coprinus atramentarius, Fr. Scarborough, G. E. M.
C. niveus, Fr. do do Greetland, W. W.
C. ephemerus, Fr. do do

- C. comatus*, Fr. Scarborough, G. E. M.; Smeaton, H. T. S.; Great Horton, W. W.
C. radiatus, Fr. do do Heaton, H. T. S.
C. extincorius, Fr. Horton in Ribblesdale, H. T. S.
C. fuscescens, Fr. Heaton, H. T. S.
C. micaceus, Fr. Hawsworth, H. T. S. and W. W.
Cortinarius anfractus, Fr. Scarborough, G. E. M.
Paxillus involutus, Fr. do do Bolton Woods, H. T. S.; Baildon, W. W.
Hygrophorus conicus, Fr. do do
H. niveus, Fr. do do
H. coccineus, Fr. Baildon, H. T. S.
Lactarius mitissimus, Fr. Scarborough, G. E. M.
L. theiogalus, Fr. do do
L. serifluus, Fr. do do
L. circellatus, Fr. Nab Wood, H. T. S.
L. quietus. Heaton, H. T. S.
Russula heterophylla, Fr. Scarborough, G. E. M.; Bolton Woods, H. T. S.
R. emetica, Fr. do do

(To be continued.)

Rainfall for April.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1881.	1880.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·16	12	10·12	* 10·52	15	0·36
HALIFAX... (F. G. S. Rawson)	360	1·06	10	14·4	12·0	...	...
WAKEFIELD (E. B. Wriggles- worth)	100	1·30	11	8·37	...	11	·45
STANLEY..... (do.)	250	1·28	11	7·89	...	11	·46
THORNES..... (do.)	90	1·30	11	8·32	...	11	·36
BARNSELY ... (T. Lister) ...	350	1·10	12	7·96	7·21	14	0·35
INGBIRCHWORTH (do.)	853	1·02	12	10·47	11·44	14	·32
WENTWORTH CASTLE (do.)...	520	1·09	10	9·52	8·51	14	·37
GOOLE ... (J. HARRISON) ...	25	1·34	10	7·33	5·78	14	·43

* This is the average to date for 15 years, 1866-80.

Short Notes and Queries.

Zygodon viridissimus, var. *rupestris*, LIND.—I wish to report the finding of the above interesting moss in Miller's Dale, on shaded limestone rocks. This is, I believe, the first time its occurrence in Derbyshire has been noticed.—G. A. HOLT, Manchester.

MIGRATORY ARRIVALS.—Ray's wagtail I first saw on April 17th, in the Ryburne Valley, the cuckoo on the 30th, just three weeks later than the first swallow. Martin, sand martin, and sandpiper, on May 1st.—F. G. S. RAWSON, Halifax.

SPRING MIGRANTS.—March 7th, a flock of green plovers, in their northern migration ; March 14th, a flock of green plovers ; April 2nd, wheatear at Dalton ; April 15th, willow-warbler, Penny Spring Wood. April 24th, a friend told me he had seen a woodcock in Penny Spring, which I very much doubted. But the following morning I went to the place and found its droppings, though I did not see the bird ; I went again the following morning, and found another place where it had been, but again had not the pleasure of seeing the bird. April 28th, I had a walk to Sowerby Bridge, and on my way saw the following spring migrants :—wheatear, Ainley Top ; willow warbler, Elland Wood, plentiful ; wood-warbler, two pairs ; chiffchaff ; pied-flycatcher, at the Tunnel End ; also the redstart and tree-pipit, at Calder Hebble ; swallows were plentiful ; also martins and sand-martins. I then took the Canal Bank, and saw the pied wagtail, plentiful ; also several pairs of Ray's wagtail. May 1st, I had the pleasure of hearing the cuckoo, at Broken Cross and Mellor Wood. May 2nd, I saw several pairs of whinchats ; also spotted flycatcher, in Penny Spring Wood. May 14th, I heard the landrail, top of Dalton and near Roundwood, one in Pontey's Gardens, and one at Tinderley, Almondbury. May 17, grasshopper warbler at Dalton Lees, sedge warbler, Pontey's Gardens ; blackcap warbler and garden warbler, Roundwood ; also lesser redpoll in Pontey's Gardens.—JAMES VARLEY, May 17th.

ORNITHOLOGICAL NOTES, LEEDS—In this district the present spring has been very backward, both for the breeding of our resident birds, and the arrival of spring migrants. The ringdove, song thrush, and missel thrush, which are amongst our earliest breeders, had not eggs until the fourth week in April, whereas during the past five years, we have seen eggs before the end of March. During the month of April, the weather was fine, but exceedingly cold, and this may account for the spring migrants not being noticed so early as usual, as they do not sing for some

days after their arrival if the weather is cold and unfavourable. On April the 16th, the willow wren, chiffchaff, and swallow had arrived. April 18th, I saw a nest of the carrion crow containing six eggs, at Ryther. April 23rd, magpie had eggs, the wheatear, grasshopper warbler, and sand martin were to be seen and heard at Adel. April 30th, I heard the cuckoo at Roundhay. May 1st, yellow wagtail at Roundhay. May 2nd, my brother saw five black-headed gulls at Fewston Reservoir, and also a pair of common sandpipers at Leathley. The cuckoo had also arrived in Wharfedale. May 7th, one single swift in company with sand-martins at Strensall Common; also heard the whitethroat and landrail near York. May 8th, heard the landrail near Leeds. May 14th, ring-ouzel were plentiful on Rombalds Moor; they had not yet begun to nest. Up to the present date I have not seen a single house-martin. They are becoming more scarce every year in this district.—WALTER RAINE, Leeds, May 17th.

JACK SNIPE'S NEST AT BARKISLAND.—A jack snipe's nest was taken on Ringstone Edge, Barkisland, in July, 1879; it contained four eggs of the normal type, and two days after the parent bird was shot. The nest, eggs, and bird are now in the possession of Mr. Farrar Lumb, Westgate, Elland. I think the above is proof positive of the nesting of the jack snipe in Britain.—C. C. HANSON.

THE CUCKOO.—I had not intended taking any notice of your Netherton correspondent, with regard to the cuckoo, on March 12th. But one mistake generally leads others astray, for in this month's *Naturalist* I see that Mr. Bunker gives the 18th of March, at Goole. Now, in all my long experience with the cuckoo, I never saw it before the end of March, in forward springs. It is a soft-billed bird, and feeds on insects and larvæ, and could not have subsisted so far north, in a spring like this. It never begins to sing until the leaves of the sycamore and larch trees begin to expand. I have looked in all the likely places which it haunts, and did not see it before the first of May.—JAMES VARLEY, Almondbury Bank, Huddersfield, May 9th.

OSPREY (*Pandion haliaetus*) NEAR HUDDERSFIELD.—I have had this bird brought in to preserve. It was killed on Goodbent Moors, by Robert Hogg, gamekeeper for Messrs. Seth Senior and Sons, Shepley, on May 8th, at eight o'clock p.m. It measured 21in. from beak to tail-end, and 5ft. expanse of wings; weight, 2lbs. 11½oz. It is a mature male bird, and its crop contained the remains of a fish.—JAMES VARLEY, May 10th.

DUNLINS, &c., AT STRENSALL COMMON.—On the 7th of May my brother and I visited Strensall Common, where we came across a small flock of dunlins, which were very tame, and allowed us to creep within thirty yards before taking flight, and then only flew to the margin of an

adjoining lagoon, where, with the aid of a field glass, we were able to see them very distinctly. This is an unusual place for these birds at this time of the year, though they are said to breed on most of our Yorkshire moors. I should be glad to hear of any authentic instance of this bird breeding in Yorkshire. I visit the home of the curlew and golden plover regularly during the spring and summer, but still I have never caught sight of the little dunlin. We also saw at Strensall a very large flock of pied wagtails, and a pair of fine herons.—WALTER RAINE, Leeds, May 16th.

PIED FLYCATCHER AT BINGLEY.—Whilst sauntering through Bingley Wood on the 14th inst., my brother and I had the gratification of seeing, for the first time in this locality, that local and beautiful bird the pied flycatcher. Since the above date I have been several times for the purpose of ascertaining whether it was breeding, or merely migratory, as I had not seen the female bird until to-day. This morning, however, after waiting some time, I observed the female with some building material in her mouth, which she took at last to her nest, which was placed in a hole of the trunk of a fine beech tree. Immediately after the flycatcher had been to its nest I saw a blue-tit enter, possibly in search of a breeding place; and my only fear now is that it will dispossess the rightful owners, as its pugnacity is only equalled by its impudence.—E. BUTTERFIELD, Wilsden, May 18th.

Vanessa Antiopa IN WHARFEDALE.—On the 11th inst. my brother chased a *V. Antiopa* for a considerable distance along the highway near Barden Tower, in Wharfedale. A friend of his, who was with him, first started it, and called out, "A Camberwell beauty." My brother says he could not possibly mistake it for any other butterfly.—E. BUTTERFIELD, May 18th.

Acronycta alni.—I had yesterday the delight of seeing a lovely *Acronycta alni* in my breeding cage. It is now on my setting board.—JOSEPH ANDERSON, junr., Chichester, May 14th.

KILLING INSECTS WITH AMMONIA.—A method of killing lepidoptera and other insects more frequently used in the southern than our counties, is by means of ammonia. I first saw it used by Mr. W. H. Tugwell, of Greenwich, when collecting with him in Abbots' Wood, in Sussex, about five years ago. Three or four ounces of carbonate of ammonia (which may be bought for a few pence, and will last a whole season through), are placed at the bottom of a wide mouthed jar (glass is best), big enough to hold fifty or sixty ordinary chip boxes, and having a close-fitting cork or stopper. Into this jar the chip boxes are emptied just as they are, without even removing the lids at all, on coming in from a collecting excursion, and then left alone until next morning. The insects inside the boxes will then be found to be in perfect order, and in splendid

condition for setting ; better even than when just killed by the ordinary methods. I experienced one objection to this plan, which, however, does not appear to have been shared by others, viz. : that the ammonia in the bodies of the insects sometimes affects the pins in such a way that with very little pressure they break off ; and this being as likely to occur in a valuable specimen as in any other, is apt to be very annoying. It is necessary also to have two sets of chip boxes, as the ammonia fumes cling to them for some hours.—GEO. T. PORRITT.

ERRATUM.—Page 150, line 3 from bottom, for “threepence,” read “three shillings.”—N. COOKE.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Meeting April 26th, an interesting paper on “Sketches of Insect Economy” was read by Mr. W. E. Brady ; and on 12th May, by Dr. W. J. Lancaster, on “The Structure and Habits of Fishes,” illustrated by specimens, amongst which was the skeleton of a haddock, with gills of that and other fish prepared by Mr. G. Rose. The botanical section reported flowers appearing chiefly since April—generally late. Most of the spring migrants have arrived (with the exceptions named in last month's *Naturalist*), rather after the average time. The chiffchaff (March 18th) was exceptionally early ; the second date for it in this district is March 29th, its average date is April 2nd.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting April 26th, the president (Mr. W. West) in the chair. Mr. H. Soppitt exhibited a number of land and fresh-water shells from Gisburn and Matlock. Messrs. Carter and Firth described a ramble to the Wallasey sandhills, and exhibited *N. zonaria*, *T. opima*, *T. rubricosa*, and *L. multistrigaria*. Mr. Carter also exhibited ova of *N. zonaria*, and described the manner in which they are deposited. Mr. Bennett exhibited *Triton cristatus*, from Skegness. Mr. B. Illingworth exhibited larvæ of *T. rubi*, and ova of *O. antiqua*. Mr. J. Faull read an interesting paper on “Leguminous plants,” in which he confined himself to the food plants of this group. He also explained the structure of tendrils.

MEETING, May 10th, the president in the chair.—Mr. A. Crawshaw read an interesting paper on natural history observations. Mr. T. Richmond exhibited, on behalf of Mr. Hogarth, a number of interesting plants from New Zealand and Tasmania. Mr. Illingworth exhibited a number of insects, amongst which was *Carabus nitens* ; and made some remarks on the female of *S. carpini* still attracting males after copulation, a fact also noticed by several other members. Mr. West exhibited *Gymnostomum calcareum*, which he had collected in Cheedale, Derby-

shire. This moss is not in the last edition of the London Catalogue, except in the excluded species, as having previously been reported on imperfect evidence. He also shewed some rare Scotch mosses, and about 100 species of lichens.—H. T. SOPPITT.

ELLAND-CUM-GREETLAND NATURALISTS' SOCIETY.—Monthly meeting 9th May, Mr. C. C. Hanson (the president) in the chair. A number of local botanical specimens were placed on the table. The following summer migrants were reported:—April 11th, wheatear; April 13th, sand martin and yellow wagtail; April 15th, swallow and house martin; April 17th, willow wren and Ray's wagtail; May 1, cuckoo, tree pipit, and chiff-chaff; May 2nd, garden warbler and redstart.—ALBERT FIELDING.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting 25th April, the president (Mr. C. P. Hobkirk) in the chair. In botany there was a large number of specimens laid on the table by Messrs. Shaw, Armitage, and Bartlam. Among the number were the following, viz.:—*Veronica Beccabunga*, *Luzula pilosa*, *L. campestris*, *Vinca minor* (Waterloo Bridge), *Angelica sylvestris*, *Ranunculus auricomus*, *Caltha palustris*, *Lathræa squamaria* (Brighouse), *Linaria cymbalaria*, *Narcissus pseudo-narcissus*. Mr. Varley showed the two following specimens from Lytham, viz., *Draba verna* and *Viola tricolor*. Mr. C. P. Hobkirk exhibited the following mosses, viz., *Hypnum arcuatum*, *H. palustre*, *Licranella squarrosa* from the moors, and *Campylopus introflexus* from Jersey. In entomology Mr. F. Ellis showed *Teniocampa rubricosa* and *T. instabilis*. Mr. Varley recorded having seen and heard the following spring migrants:—wheatear, willow warbler, bluetit, grasshopper warbler, and Ray's wagtail. Mr. Jno. Armitage then gave his lecture on the "Fertilization of Flowers."

MEETING 7th May, Mr. S. L. Mosley in the chair.—Mr. James McKenzie exhibited the following from Barrow:—Hæmatite, or kidney ore; azurite and lignite, from Festiniog, North Wales: a large stalagmite and selenite, Nobe Cavern, South Australia; also echinodermata, from the chalk, South Australia; these latter, he thought, had not yet been found in this country. In conchology a number of beautiful specimens of *Elenchus roseus*. In botany Messrs. Shaw, Wilkinson, and Fisher laid on the table a number of specimens of local plants. Mr. S. L. Mosley exhibited a specimen of the sawfly (*Trichiosoma betulæ*), which had just freed itself from one of the cocoons he laid before the members on the 9th of last month.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting April 25th, the president (Mr. S. J. Capper) in the chair.—The president read a paper entitled "Lepidoptera collecting in the New Forest," in which he detailed his experience of several holidays in that delightful part of the country, giving a lengthy list of the species of lepidoptera captured by himself and his companions. He remarked the great profusion

of all insects, especially butterflies, as compared with more northern parts of England, and after describing the methods of searching for and capturing particular species, he concluded by narrating a horrible adventure which befel two entomological friends whilst collecting insects. Mr. Nicholas Cooke mentioned that he had that day bred a specimen of *Platypteryx sicula*; Mr. Johnson, exhibited a beautiful variety of *Cymatophora flavicornis*, captured at Chat Moss; and the secretary, coleoptera, including six species of *Aphodius*, collected recently on the Wallasey sandhills.—J. W. ELLIS, Sec.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, May 16th, Dr. Carrington, F.R.S.Ed., president, in the chair.—Capt. Cunliffe gave a report of the bryological excursion which had been made by a section of the members to the neighbourhood of Dolgelly and Barmouth during the Easter holidays. Amongst the rarer mosses found were *Plagiothecium Borrierianum*, *Hyocomium flagellare*, *Heterocladium heteropterum*, *Antitrichia curtipendula*, *Mnium cuspidatum*, and *Tetraphis pellucida*—all in fruit. The rare *Hymenophyllum tunbridgense* was also amongst the rarities found. Mr. W. H. Pearson (one of the party) brought home a good collection of hepaticæ, and exhibited two hepatics which he had received from the Rev. E. N. Bloomfield—*Scaponia irrigua* and *Jungermannia capitata*. These had been found at Hastings. After Mr. Cunliffe had kindly distributed some of the mosses, Mr. Thomas Brittain exhibited a series of lichens which he had recently mounted in such a manner as to serve as herbarium specimens, and also for microscopical investigation; he also reported that he had found the rather rare *Æcidium calthæ* on a recent visit to Ireland. Mr. Cash reported that he had recently found the rare *Tetradontium Brownianum* at Staley-Brushes, whilst out with the members of the Manchester Microscopical Society. The hon. secretary exhibited a specimen of the new British moss, *Lescuræa saxicola*, which had been discovered on Ben Lawers last August, by Mr. W. West, of Bradford; and also another new British moss—*Gymnostomum calcareum*,—found by the same ardent bryologist near Buxton, July, 1879.

WAKEFIELD NATURALISTS' AND PHILOSOPHICAL SOCIETY.—Meeting April 20th, a most interesting lecture was delivered by Mr. W. D. Roebuck, of Leeds, Mr. E. B. Wigglesworth, in the chair.—Mr. Roebuck's subject was "The Extinct Animals of Yorkshire." After pointing out from a map several forest districts which formerly existed in this county, he proceeded to refer to some of the extinct wild animals which inhabited the forests, and in speaking of the haunts of these animals Mr. Roebuck introduced numerous old legends having reference to the animals he mentioned, and said that the last wolf and wild boar in Yorkshire were said to have been killed by John O'Gaunt, at Rothwell. Wolves were formerly rather plentiful at Woolley, and wild boars at Chevet, and the latter animals were frequently served up as

favourite dishes on special occasions. The following migrants had been noted in this district by Mr. Morton, and others:—March 18th, chaffinch; 25th, wheatear; April 6th, brambling; 11th, swallow; 12th, tree pipit and yellow wagtail; 14th, cuckoo.

MEETING May 4th.—Lecture by Mr. J. L. Chaplin, on “Carbon and its Compounds.” Mr. George Parkin presided. The lecturer commenced by alluding to the wide diffusion of this element through nature. Accepting the nebular hypothesis as the most plausible theory of the world’s origin, he described the probable condition in which carbon must have existed at that period. After referring to the various forms in which carbon is found to exist on the earth’s surface, he entered into a brief explanation of the laws of chemical combination, showing how they affected the element of carbon. He then rapidly reviewed many of its combinations, which he classified under various heads. The concluding part of the lecture was occupied with a notice of the important work accomplished by carbon in the vegetable and animal kingdoms. The lecture was illustrated by various experiments, conducted by the lecturer’s son, Mr. J. H. Chaplin. Mr. Wigglesworth reported the following spring migrants. Swift, at Fenay Bridge, May 1st; sand-martin, at Clayton West, May 2nd; house-martin, at Bretton West, May 2nd; landrail, at Thornes, May 2nd.—E. B. W.

YORKSHIRE NATURALISTS’ UNION.—The second excursion of the year was made on Saturday, 14th May, to the Rivelin Valley, with Sheffield as a rendezvous and meeting-place. Admirable arrangements having been made by Mr. J. C. Burrell, the local secretary (who is also the secretary of the Sheffield Naturalists’ Club), two parties started in the forenoon for the exploration of the Rivelin Valley by two separate routes. One—a botanical party—was led by Mr. A. Carr; the other—geological—by Mr. J. A. Blaydes. Such of the Sheffield members as were able only to spare a half-day, drove in the afternoon to Cliffe Rocher, or “Little Matlock.” The meetings were all held at the King’s Head Hotel, Sheffield. In the absence of the president and vice-presidents, Mr. Alfred H. Allen, F.I.C., &c, president of the Sheffield Naturalists’ Club, was called to the chair. The roll-call showed that representatives were present from Barnsley, Goole, Holmfirth, Leeds (Conchological Society, Geological Association, and Naturalists’ Club), Rastrick-cum-Brighouse, Sheffield, and Wakefield. The individual attendance, mostly Sheffield members, was about 70 or 80. The list of new subscribers included Messrs. Geo. Foster and Wm. Foster of Market Weighton, Mr. A. Bottomley of Keighley, Mr. T. E. Vasey of Harrogate, Mr. C. J. E. Broughton of Wortley, and Messrs. W. G. Roper, Geo. Siddell, Wm. Sissons, G. S. Cadman, W. R. Carter, A. Scargill, J. C. Burrell, J. E. Westby, and A. E. Law, of Sheffield. Thanks were voted, also for donations to the library, of which the list included 26 titles. A hearty vote of thanks was then passed to the local secretary, to the

leaders of parties for their assistance, and to the Sheffield Naturalists' Club for defraying the additional cost of publishing a four-page instead of a one-page circular. The Sectional reports were then taken. In the absence of the officers of the Conchological section, Mr. W. Denison Roebuck reported that very few shells had been obtained, the weather and geological character of the locality being both unfavourable. For the Entomological section Mr. E. B. Wigglesworth (secretary) reported. Of coleoptera there were 15 species, viz., *Notiophilus biguttatus*, Fabr. ; *Loricera pilicornis*, Fabr. ; *Anchomenus prasinus*, Thunb. ; *A. junceus*, Scop. ; *Pterostichus vulgaris*, Linn. ; *P. striola*, Fabr. ; *Geotrupes sylvaticus*, Panz. ; *G. mesoleius*, Marsh. (*Stercorarius* of Sharp's Catalogue) ; *Agriotes obscurus*, Linn. ; *Meloe violaceus*, Marsh. ; *Tachinus rufipes*, De G. ; *Conosoma pubescens*, Gr. ; *Philonthus politus*, Fabr. ; *Othius fulvipennis*, F. ; *O. punctipennis*, Lac. Hymenoptera—four species of ants, two of bees, and two ichneumonons. In lepidoptera one larva and two butterflies were obtained. The officers of the Botanical section being absent, Mr. A. Carr of Sheffield enumerated the mosses found (46), including *Sphagnum plumosum*, *S. contortum*, *S. cymbifolium*, var. *squarrosulum*, *Aulacomnium androgynum*, *Fontinalis squamosa*, *Pterygophyllum lucens*, *Hyocomium flagellare*, and *Plagiothecium sylvaticum*. The most uncommon hepatics (18) noted were *Asterella hemisphærica*, *Bazzania trilobata*, *Blepharozia ciliaris*, *Mylia Taylori*, *Nardia emarginata*, *Aneura pinguis*, and *Aneura sinuata*. No lichens, fungi, nor algæ were reported. Mr. Councillor F. Brittain, of Sheffield, then followed, with interesting observations on the phanerogamic plants noted, which included *Cardamine amara*, *Hypericum elodes*, *Ulex Gallii*, *Ornithopus perpusillus*, *Rubus affinis*, *R. rhamnifolius*, *R. leucostachys*, *R. macrophyllus*, var. *umbrosus*, *R. diversifolius*, *Rosa mollissima*, *R. tomentosa*, *Torilis nodosa*, *Crepis paludosa*, *Vaccinium oxycoccos*, *V. Vitis-idæa*, *Mentha rubra*, *Scutellaria minor*, *Carex muricata*, *C. pendula*, *Polypodium Dryopteris*, and *Equisetum maximum*. Mr. Brittain also gave some remarks on the flora of the district, and regretted the Union had not chosen a more productive locality. Mr. B. Holgate, F.G.S., of Leeds, secretary of the Geological section, reported. In the absence of the officers of the Vertebrate section, Mr. Thos. Lister of Barnsley reported birds in the Rivelin Valley and the wooded glens of Wyoming and Ribblesden :—Migrants—all of the swallow tribe, also, the cuckoo, sand-piper, white-throat, willow and wood warblers, tree-pipit, redstart, sedge-warbler, whinchat, corn-crake, garden-warbler ; amongst the residents were magpie, missel thrush, blackbird, wren, meadow pipit, pied wagtail, grey and green linnets, and lesser redpoll, bullfinch, yellow and corn bunting, chaffinch, starling, ring-dove, marsh tit—twenty residents. The curator reported the short-eared owl, May 12th, and the rough-legged buzzard, Sept. 1880. Mr. E. Howarth, curator of the Sheffield Museum, followed, after which a vote of thanks to the chairman concluded the proceedings.—W. D. R.

Diary.—Meetings of Societies.

- June 1. Entomological Society of London.
 „ 2. Linnean Society of London, 8 p.m.
 „ 4. Huddersfield Naturalists' Society.
 „ 6. (Whit-Monday).—Yorkshire Naturalists' Union.—Excursion to
 Hornsea. Local Sec., Mr. N. F. Dobree, the New Walk,
 Beverley.
 „ 7. Bishop Auckland Naturalists' Field Club.
 „ 7. Bradford Naturalists' Society—"Conchology," Mr. C. E.
 Waddington.
 „ 7. Leeds Naturalists' Club, &c.—Microscopical and Botanical
 Sections, 8 p.m.
 „ 7. Liversedge Naturalists' Society.
 „ 8. York and District Naturalists' Field Club.
 „ 10. Dewsbury Naturalists' Society.
 „ 14. Leeds Naturalists' Club, &c.—Entomological and Vertebrate
 Sections.
 „ 16. Linnean Society of London.
 „ 20. Huddersfield Naturalists' Society—"Nature's Seeding," Mr. J.
 Armitage, 8 p.m.
 „ 20. Manchester Cryptogamic Society.
 „ 20. North Staffordshire Naturalists' Field Club.—Excursion to Pick-
 wood, and Haregate—Leader, Mr. W. Challinor.
 „ 21. Leeds Naturalists' Club, &c.—Microscopical and Botanical
 Sections.
 „ 21. Bradford Naturalists' Society—"Algæ," Mr. W. West.
 „ 27. Lancashire and Cheshire Entomological Society.

RECEIVED for Review in our next, "Insect Variety," by A. H.
 SWINTON.

TRANSACTIONS of the YORKSHIRE NATURALISTS' UNION.

PART I. FOR 1877, contains the commencement of "The Birds of Yorkshire," by Mr. W. E. Clarke, M.B.O.U.; of an "Annotated List of the Land and Fresh-water Mollusca of Yorkshire," by Messrs. Wm. Nelson and J. W. Taylor; a complete list of Yorkshire Hymenoptera, with references to literature of that order, by Mr. W. Denison Roebuck; a paper on "Yorkshire Macro-lepidoptera in 1877," by Mr. G. T. Porritt, F.L.S.; one on "Yorkshire Micro-lepidoptera in 1877," by Mr. Wm. Prest; papers by Mr. S. L. Mosley, on "Yorkshire Diptera," and on the Yorkshire species of Hemiptera of the Family *Psyllide*; and a report on Yorkshire Botany in 1877, by Dr. H. F. Parsons, F.G.S.

PARTS II. AND III. FOR 1878 contain the continuations of Mr. Clarke's Birds of Yorkshire, and of Messrs. Nelson and Taylor's Land and Fresh-water Mollusca of Yorkshire; an elaborate report on Yorkshire Botany in 1878, by Dr. Parsons; the commencement of Dr. Parsons' "Moss-Flora of the East-Riding"; papers on Yorkshire Lepidoptera in 1878, by Mr. Porritt, F.L.S.; on Yorkshire *Ichneumonide*, by Mr. S. D. Bairstow, F.L.S.; and on Yorkshire Hymenoptera, observed in 1878, by Mr. W. Denison Roebuck.

PART IV. FOR 1879, in preparation.—Amongst papers in preparation for future parts is a Catalogue of Yorkshire Lepidoptera, to be written by Messrs. G. T. Porritt, F.L.S., and W. Prest.

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No. LXXII.

JULY, 1881.

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Original Articles.

THE ISLAND OF RODRIGUES, AND ITS FAUNA, AS THEY WERE, AND AS THEY ARE.*

BY THE REV. H. H. SLATER, B.A., F.Z.S., &c.,

President Vertebrate Section, Yorkshire Naturalists' Union; late Naturalist to
H.M. Transit of Venus Expedition to Rodrigues, 1874, &c., &c., &c.

THE Island of Rodrigues, which is to form the subject of the following observations is, geographically speaking, very insignificant; it is about twelve miles long and six in greatest breadth. It is situated out by itself in the middle of the Indian Ocean, the nearest land being the Island of Mauritius, distant a little more than 300 miles to the W S W. Its latitude is about 20° S., and its longitude 65° E.

Having said so much as to its position, I must next attempt to give some idea of its general appearance. It is, from the sea especially, a charming island, though less so than Mauritius, which goes by the poetical name of "The star and key of the Indian Ocean." Rodrigues is anything but monotonous, there being hardly an inch of level ground in it. The highest hills are in the centre of the island, the chief one about 1,300 feet above sea level, and several others coming near this height. From these central peaks many small streams run down to the sea, mostly through deep ravines, often well-wooded. These ravines have frequently almost precipitous sides, which makes an inland journey a very considerable affair, as to make five miles as the crow flies (though the crow doesn't fly in Rodrigues at all), you may have to walk a dozen of the very roughest, with vegetation in some places above your knees. People consequently don't travel much by land, but go round the coast in a pirogue (or canoe) to the nearest point to where they want to get.

In many parts, owing, I believe, to the wanton destruction of the woods by fire, and otherwise, the country looks bare and desolate, but in others it is well wooded. The woods, too, have a very picturesque appearance, especially to an English eye, as palms of various kinds are a great feature in them.

The island is surrounded by coral reefs, which, in some places, are three miles from the shore, and in others only as many hundred yards. Within the reefs there is shallow water, in which little islands are scattered here and there.

N. S., VOL. VI.—JULY, 1881.

* Read before the Leeds Naturalists' Club and Scientific Association, May 31st, 1881.

The climate, considering that the island is within the Tropics, is a pleasant one, and the temperature averages about 78° all the year through. During the fine season, which lasts from May till October, the weather is fine and dry, and pleasant enough. From the middle of November till the end of April it is much hotter, and often uncomfortably warm. From December to April one may chance to come in for a cyclone, or hurricane—a sufficiently unpleasant experience—which I had the good fortune to be spared. To give some idea, however, of what a hurricane can do when it tries, I will mention a few of the effects produced by the great cyclone of 1868 in the sister island of Mauritius.

“Coming events” are popularly supposed to “cast their shadows before them,” and this event was no exception. For ten days previously the weather was intensely oppressive, and the heat scorching, the atmosphere, meanwhile, being so full of electricity as to produce great and continual discomfort; the barometer fell by fits and starts, and the wind blew in gusts from all points of the compass alternately,—a sure precursor of a cyclone.

Then the storm burst. The tempest raged furiously for three days, and on the 13th of March, when it ceased, the island was devastated. About ninety persons were killed, mostly by falling houses. Of seventy ships in the harbour of Port Louis, many had been torn from their moorings and dashed against others, or stranded. Many of these were afterwards condemned with their cargoes,—a loss of several hundred thousand pounds.

The iron railway viaduct over Grand River was dismantled. Two of the enormous girders, each 200 feet in length, and more than 300 tons in weight, were torn bodily from off their piers and dropped into the river. Imagine, if you can, the terrific force of a wind which could do this. The Tay Bridge accident is far short of this, when the bridge, a tall and rather flimsy erection, gave way owing to lateral pressure and the weakness of the piers. Here the piers stood, but the bridge was torn off and flung down. Over 23,000 dwelling-houses, mostly coolies' huts, were blown down or carried away, and about as many more damaged. One large wooded house, near Port Louis, was turned upside down, and left standing on its roof. Sixty-five bridges, many of stone, were destroyed, and the havoc among trees and cattle was enormous.

When we went to the East, we were anxious to see all that could be seen, but we all “drew the line” at cyclones.

To return to Rodrigues. The geology of the island, which previously to our visit in 1874, was supposed to be of granite, was found to be less interesting than was expected. The island consists of a large pile of that kind of lava which geologists call Dolerite, of which the numerous flows could be almost counted by studying the sides of the water-courses. In some parts of the island there were fine cliffs of basalt, in the form of columns packed close together, looking like rows of vast organ pipes, and very similar in appearance, though upon a larger scale, to those which have made our Island of Staffa so famous. No minerals were to be found of any beauty, though Arragonite and Zeolites occurred sparingly.

The only exception to the general volcanic structure of the island lies in some patches of coralline limestone, found only in the western end of the island. These consist of large beds, as much as a mile in diameter, and fifty feet or more in depth, of marine coral, slightly altered by atmospheric agency, upheaved by the basalt, and lying upon it. In these patches are found caves, which contain the bones and other remains of the extinct fauna of the island, which it was my special province, on the Transit Expedition, to investigate.

Rodrigues has no history to speak of. In 1761 it was the scene of another Transit of Venus expedition—a French one, under the Abbé Pingré, of which the results are well known to astronomers.

Next, in 1806, the Indian Government decided upon taking from the French, with whom, as you know, we were then at war, the islands of Mauritius (then called Isle de France) and Bourbon (or Réunion). As a preliminary step they occupied Rodrigues with a large body of troops and Sepoys, and great stores. After several unsuccessful attempts Mauritius and Bourbon were at length taken in 1810, and Rodrigues abandoned.

Connected with this expedition there is a circumstance, which I may mention, of considerable interest. There was at the time in Mauritius a remarkable French creole (M. Fillifay), who had the power of discerning objects at a vast distance out at sea, long before they were visible to anyone else. And he came to the French Governor, in 1810, and told him he had seen the ships assembling at Rodrigues, 300 miles distant, for the invasion of Mauritius. For this piece of news it is supposed that he was imprisoned for raising false alarms. He was afterwards employed regularly at the Port Office to give notice of ships approaching. On one occasion he declared that he saw two ships joined together, and shortly afterwards a four-masted American schooner made its appearance, the first four-masted vessel

that had visited Mauritius. On another he described an East-Indiaman dismasted 400 miles off, and said afterwards that he could see her rigging up jury-masts, and steering for Port Louis, which was the case.

He used to stand on a hill on the coast at dawn, and after surveying with the naked eye, not the horizon, but the sky, he used to go and describe what he had seen. Objects appeared to him upside down, as as they do under the microscope. Though he tried his powers in Europe, and even in Bourbon, he could only exercise his uncommon faculty in Mauritius, a circumstance probably due to the extreme rarity of the atmosphere of that island.

After the conclusion of the French war in 1810—to return once to Rodrigues—nothing of interest occurred there till 1874, when the Transit of Venus expedition, to which I had the honour to be attached, visited the island.

The trade of Rodrigues has seen better days. Formerly planters lived there, and cultivated sugar-cane, indigo, vanilla, and coffee; but the cyclones were so destructive to the crops that they gave it up, and the only traces of their occupation are found in the orange and coffee-bushes and indigo plants, and so on, now growing wild. There are now only two exports—dried fish, caught round the island, and cattle, which are bred there, and which live to the number of many thousands in a half-wild state all over it. We were advised to carry a few ball cartridges when wandering over the island, in case the cattle were aggressive, as I believe they are occasionally. The principal imports, as far as I know, are rice and rum. The rice, with patates, or sweet potatoes, and dried fish, forms the staple food of the natives; and as for the rum, they consume as much as they can get hold of.

The natives, or creoles, are a mixed race; the principal element in the breed is Malagash, or Madagascar negro. Then they have a touch of Hindoo, and a touch of French blood; and they have inherited, I think, the vices of all these three races, and have a few of their own besides. They may, of course, have inherited all the virtues of the three nations as well, but I must say they don't quite give you that idea. They are dishonest, dirty, revengeful, and very idle. The most energetic of the natives are fishermen; they catch fish in long nets, treat it like Finnan haddocks, and dry it on the rocks in the sun, after which it is sent to Mauritius, tied up in large bundles. Others plant sweet potatoes and a little tobacco, and pass the rest of their time as happy, idle loafers. They all carry knives, and would be very unpleasant neighbours if they had more courage. One drew a knife,

doubtless with sinister intentions, upon the magistrate whilst we were there, when his back was turned. Fortunately the magistrate heard it, and turned round quickly, got his customer up into a corner, and treated him to a little "science"; but he quite expected to get a knife into his back some day. This is the kind of gentry the natives of Rodrigues are. I would willingly give them a better character if I could, though I do not know whether they would like it even if I did, and they heard of it.

The island is governed by a police-magistrate appointed by the Mauritius Government. Captain Bell was the magistrate when we were there—a gentleman for whose kindness the naturalists were very grateful. Amongst other things he gave us up his official residence as our head-quarters. His staff consists of a white sergeant and a corporal, and several policemen who are Mauritius creoles. In addition to the magistrate and his family, the sergeant of police, an Italian storekeeper, and a French priest form the whole white population; the natives, I believe, are about 1,500 in number.

(To be continued.)

YORKSHIRE NATURALISTS' UNION.—CRYPTOGAMIC REPORT FOR 1880.

BY WM. WEST, CRYPTOGRAMIC SECRETARY.

(Continued:)

Explanation of initials—G. E. M., G. E. Massee; H. T. S., H. T. Soppitt; W. W., W. West.

FUNGI—Continued.

Russula fragilis, Fr. Bolton Woods, H. T. S.; Nab Wood, H. T. S. and W. W.

R. sanguinea, Fr. Newlay, H. T. S.

Nyctalis asterophora, Fr. Scarborough, G. E. M.

Marasmius caulicinalis, Fr. do do

M. ramealis, Fr. do do

M. peronatus, Fr. do do

M. rotula, Fr. do do

M. epiphyllus, Fr. do do Castle Howard,
G. E. M.

M. androsaceus, Fr. Saltaire, H. T. S. and W. W.

Lentinus cochleatus, Fr. Scarborough, G. E. M.

Schizophyllum commune, Fr. do do

Lenzites sepiaria, Fr. do do

- Boletus luteus*, L. Scarborough, G. E. M.
B. subtomentosus, L. do do
B. pachypus, Fr. do do
B. versipellis, Fr. do do
B. elegans, Schum. do do
B. chrysenteron, Fr. do do
B. flavus, With. Newlay, H. T. S.
B. impolitus, Fr. do do
Polyporus destructor, Fr. Scarborough, G. E. M.
P. velutinus, Fr. do do
P. chioneus, Fr. do do
P. hispidus, Fr. do do
P. annosus, Fr. do do Bolton Woods,
H. T. S.
P. adiposus, B. and Br. do do
P. blepharistoma, B. and Br. do do
P. cervinus, Pers. Horton-in-Ribblesdale, H. T. S.
P. ferrugineus, Fr. Scarborough, G. E. M.
P. abietinus, Fr. do do
P. betulinus, Bull. Crosscliffe, Pickering, G. E. M.
Merulius corium, Fr. Scarborough, G. E. M.; Saltaire, Esholt,
H. T. S. and W. W.
The following from Scarborough, by G. E. M.:—*Fistulina*
hepatica, Fr.; *Hydnum farinaceum*, Pers.; *H. niveum*, Pers.; *H.*
alutaceum, Fr.; *H. repandum*, Pers.; *Radulum orbiculare*, Fr.;
Grandinia granulata, Fr.; *Odontia fimbriata*, Fr.; *Thelephora laci-*
niata, Pers.; *T. arida*, Fr.; *T. anthocephala*, Fr.; *T. sebacea*, Fr.;
Stereum sanguinolentum, Fr.; *S. spadiceum*, Fr.; *Hymenochæte*
corrugata, Berk.; *Corticium giganteum*, Fr.; *C. læve*, Fr.; *C.*
incarnata, Fr.; *C. calceum*, Fr.; *C. roseum*, Pers.; *Peniophora*
quercina, Pers.; *P. cinerea*, Fr.; *P. velutina*, Fr.; and *Coniophora*
membranacea, D. C.
Cyphella muscigena, Fr. Ayton, near Scarborough, G. E. M.
C. capula, Fr. Scarborough, G. E. M.
C. Curreyi, Berk. do do
Clavaria inæqualis, Mull. Castle Howard, G. E. M.
C. rugosa, Bull. Scarborough, G. E. M.
C. cristata, Holmsk. do do
C. coralloides, L. do do
C. fragilis, Holmsk. do do
C. uncialis, Grev. do do

- C. muscoides*, L. Settle, H. T. S.
Calocera cornea, Fr. Scarborough, G. E. M.
C. glossoides, Fr. Esholt, H. T. S. and W. W.
Typhula erythropus, Fr. Esholt, H. T. S.
Tremella fimbriata, Pers. Scarborough, G. E. M.
T. tubercularia, Berk. do do
Hirneola auricula-Judæ, Berk. do do
Næmatelia nucleata, Fr. do do
Dacrymyces deliquescens, Dub. do do
D. stillatus, Nees. do do
D. chrysocomus, Tul. do do
Lycoperdon giganteum, Batsch. Ousefleet, T. Birks.
Lycogala epidendrum, Fr. Riccall, W. W.
Chondrioderma difforme, Pers. Scarborough, G. E. M.; Goole, T. E. Birks.
Physarum album, Hdbk. 1140. Goole, T. Birks.

(*To be continued.*)

LEPIDOPTERA COLLECTING IN THE NEW FOREST, HAMPSHIRE.*

BY SAMUEL JAMES CAPPER.

My first visit to the New Forest, Hampshire, for the purpose of collecting lepidoptera, was in the month of June (viz., from the 5th to the 28th), 1869, when I was accompanied by my friend Mr. Isaac Cooke. We at first proposed locating at Lyndhurst, then and still celebrated as a most excellent central position for an entomologist's head quarters. We were diverted from Lyndhurst by the advice of Mr. Benjamin Cooke, who had a few years previously paid a most successful visit to Brockenhurst, which he emphatically pronounced the better situation.

After considerable experience in collecting in the neighbourhoods of each village, I am inclined to endorse Mr. Cooke's opinion, although it is exceedingly difficult to decide between two such splendid positions, each being surrounded with the finest possible country for the entomologist, and swarming with lepidoptera. The accommodation at Brockenhurst is not so good as at Lyndhurst, but this, to my mind, is compensated for by its being less frequented, and consequently more

* Read before the Lancashire and Cheshire Entomological Society, April 25th, 1881.

private. It was with very happy anticipations we started from Liverpool for our three weeks' holiday. Some time before arriving at Brockenhurst we gazed with delight on the beauties of the Forest on each side of the railway as we rushed through it. On arriving at Brockenhurst we inquired for the best hotel, and were directed to a small country inn, the "Rose and Crown," the hostess of which seemed not a little perplexed as to how she should provide for such an unusual influx of visitors.

We commenced operations early the following morning. We had plenty of choice as to collecting ground. There was the extensive Forest in every direction, also numerous enclosures, besides the open commons, &c. We selected for our morning's explorations "The Park Enclosure," which we had hardly entered when my companion called me to see what he thought was a fine specimen of *B. roboraria*, settled on one of the trees; this proved, however, to be *consortaria*, nevertheless a great prize. Those present who knew the delight of seeing *T. biundularia* sitting on the trees in Delamere Forest can understand our pleasure in capturing this grand moth. We, of course, worked very hard after this discovery, examining thousands of trees, and were successful in securing a fair number of specimens. In addition to these, on arriving home after our morning's labour we found our boxes filled with hosts of butterflies, and amongst the moths *Crepuscularia*, *Rubricollis*, *Dolabraria*, *Punctulata*, *Barbatis*, &c.

The difficulty, in having so many excellent collecting places to choose from, was day by day to decide which to select, each plantation, heath, and common swarming with its own peculiarities. The profusion of butterflies everywhere particularly surprised us, making collecting so different to that in the North of England.

During our stay at Brockenhurst we took the following butterflies: *Cratægi* (a few), *Sinapis*, *Cardamines*, *Sibylla*, *Selene*, *Euphrosyne*, *Lucina*, *Rubi*, *Argiolus*, *Alsus*, *Alveolus*, *Agestis*, *Tages*, *Sylvanus*, &c. We also spent one day in the Isle of Wight, filling our boxes with *M. Cinxia* and *L. Adonis*. The weather was not favourable for collecting, being cold and wet. We sugared almost every night, but without much success. The species we met with were, with few exceptions, most abundant. Butterflies literally swarmed, the difficulty being not how to fill our boxes, but what to select. An enumeration of our captures may be interesting. In addition to the butterflies mentioned, we took *Fuciformis*, *Bombylififormis*, *Filipendulæ*, *Complana*, *Quadra*, *Rubricollis*, *Jacobeæ*, *Russula*, *Villica*, *Mendica*, *Quercus*, *Coryli*, *Advenaria*, *Fasciaria*, *Maculata*, *Margaritata*, *Dolabraria*,

Erosaria, *Lichenaria*, *Repandata*, *Cinctaria*, *Roboraria*, *Consortaria*, *Consonaria*, *Crepuscularia*, *Extersaria*, *Punctulata*, *Obscurata*, *Cytisaria*, *Viridata*, *Porata*, *Punctaria*, *Trilinearia*, *Omicronaria*, *Heparata*, *Subsericeata*, *Pusaria*, *Temerata*, *Taminata*, *Belgiaria*, *Liturata*, *Euphorbiata*, *Strigillaria*, *Marginata*, *Rectangulata*, *Albicillata*, *Derivata*, *Chærophylata*, *Fulcula*, *Hamula*, *Barbalis*, *Cuccullatella*, *Cristulalis*, *Strigula*, *Pudibunda*, *Derasa*, *Batis*, *Leporina*, *Orion*, *Turca*, *Hepatica*, *Persicariæ*, *Blanda*, *Alsines*, *Fimbria*, *Bella*, *Nebulosa*, *Ænea*, and hosts of common *Noctuæ*. Although *Orion* has since been taken plentifully, it was then considered a great rarity.

One of our first excursions was to Lyndhurst, a distance of some four or five miles, the coach road being right through the Forest, and consequently we had grand collecting ground all the way. We often repeated this walk, taking one side of the road on our way thither, and the other on our return. On our first visit to Lyndhurst we called upon a dealer and made some purchases. Amongst other insects, I thought myself fortunate in securing a poor specimen of *Orion* for four shillings. That same evening, whilst sugaring, a young man (about 20), came and introduced himself to us, stating that a year or two before, he had assisted a collector of lepidoptera, and had obtained a considerable knowledge as to localities, &c., and kindly offered to give us all the information in his power. This young man—Walter Oliver—proved a great acquisition, and attended us in most of our excursions, and on a subsequent visit to the Forest the following summer, I engaged his services for the whole of the time I spent there. We told him of our visit to Lyndhurst, and of our purchase of *Orion*. He said the collector he had been with offered to give him one shilling for all the *Orion* he would send him, and he sent him a hundred. He said he would take us to the locality, which was some five or six miles away. We visited it the following evening, but were only successful in securing one specimen; indeed I have never been fortunate in taking this lovely insect in quantities.

Oliver stated that very few collectors had visited Brockenhurst, but that one old fellow, a dealer, had frequently spent the summer there. He told us many amusing anecdotes about him. “Old T” (as he was called) and his wife appear to have been extraordinary characters. They were most secretive as to the localities, &c. It is said they discovered some beetle there—a great rarity—and from one tree alone they obtained sufficient specimens to produce them £60.

From our little inn to the Forest we had to cross over a common on which the village lads assembled for cricket and other games. Almost

whenever we passed, butterfly nets in hand, these youths used to shout after us, "Oh! it's only a flopper." We were much perplexed as to what could be the meaning of this, until Walter explained that "Old T" used to offer the village lads and lasses one penny for each insect they brought to his house, provided it was of any use to him. He supplied them with pill boxes, and gave directions that they should not injure the specimen. When they brought their captures to his house, he was in the habit of opening the boxes in his parlour, emptying the contents into the room, and with the exclamation "Oh! it's only a flopper," dismissing the children minus their pennies. After the disappointed youngsters had departed, "Old T" was to be seen, net in hand, capturing what he had pronounced "a worthless flopper." The value of insects was then much greater than at present, and it is said "Old T" would have reaped a golden harvest if both he and his wife had been faithful members of a temperance society. Unfortunately they were not so, and very curious stories were in circulation about them.

On the suggestion of Oliver we spent one day at Ringwood, visiting Parley Heath, the celebrated *E. cribrum* locality. We had to walk about four miles to our hunting ground; then, having provided ourselves with small branches of trees, we commenced sweeping the heath and capturing the moths as they rose. There is considerable excitement attending this operation; sometimes we swept for hours without any success, at other times we captured several specimens in a few minutes. We were quite satisfied with our day's work, returning to Brockenhurst with some twenty or thirty specimens. Parley Heath is almost the only locality in England for *E. cribrum*, and there is great excitement in securing such a rarity. *A. caliginosa* is hunted for much in the same way as is *cribrum*. It frequents one or two rides in one or two woods, which have to be swept in the same way, as, like *cribrum*, *caliginosa* is very sluggish in its habits, at any rate in the daytime. We sugared almost every night, but without much success. This we attributed to the inclement weather.

My second visit to Brockenhurst was in company with my lamented friend Mr. Alfred Owen, from the 15th to 22nd April, 1870. The weather was very fine, and we took the following species:—*Rhamni* and *Polychloros*, hybernated specimens, the former very plentiful; *Cardamines*, *Sinapis*, *Ægeria*, *Argiolus*, *Rubi*, *Ridens*, *Gothica*, *Instabilis*, *Populi*, *Stabilis*, *Gracilis*, *Miniosa*, *Cruda*, *Lithoriza*, *Illunaria*, *Crepuscularia*, *Pictaria*, *Multistrigaria*, *Irriguata*, *Lobulata*, *Badiata*, *Æscularia*, *Adustata*, *Derivata*, &c.

The same summer I engaged the services of Walter Oliver as a companion for a fortnight, commencing the 11th July. We had a glorious time of it, working night and day. When I mention that I frequently worked eighteen hours a day, either capturing or pinning out my trophies, you will give me credit for some industry. We usually commenced our excursions at say ten o'clock in the morning, returning home at six or seven o'clock, and after a hasty dinner-tea, started for the night's sugaring.

Nothing can describe the profusion of butterflies, *Sibylla*, *Paphia*, *Adippe*, *Aglaia*, &c., swarming. We took a considerable number of *Valezina*, hardly troubling ourselves with the others.

This was one of the celebrated seasons for *Sponsa* and *Promissa*. These beautiful insects are taken every year in the Forest, but some years much more abundantly than others. In the years 1870-71 they were in the greatest profusion. There is great excitement in their capture. The sugar ought to be applied quite early in the evening, as the moths come to it long before it is dark. It was usual to sugar a considerable area, and the trees some distance apart, and we had positively to run over our sugaring ground. Activity in all ways is a necessity, as the moths are extremely coy, and do not generally settle on the sugar, but are very restless and easily alarmed. To take them in a net and immediately chloroform them we found the most successful way of securing them, but unless this is done most expeditiously they are sure to injure themselves, exhibiting a bald head. I never experienced such a season for sugaring; our trees were covered with hosts of *Noctua*; *Turca* and *Pyramidea* so numerous that we had to brush them away in capturing more valuable game.

Until accustomed to it, sugaring in a large forest—or indeed anywhere—in the middle of the night is rather a weird-like occupation. Examining the sugar for the *Catocalas* was lively enough, as we used to hunt in couples—one netting whilst the other held the lantern; but frequently we sugared our own particular trees, which we then examined, fixing a certain place to meet one another. The owls of the forest did not cheer our spirits, as they used to hoot most horribly.

A brother of mine from Southampton came over for a day's nothing with us, and expressed a desire to see how we sugared. We fitted him up with a lantern, gave him a ride in a wood to sugar and examine, telling him to meet us at a certain time. He had quite enough of it, and said, when we met, that he had never passed a more horribly lonely night in his life, and should prefer company on the next round. This reminds me of an adventure that happened to a brother entomo-

logist, who related it to me. Together with a friend they had been sugaring some trees in a wood some miles from human habitation. It was getting dark, but not sufficiently so to light their lanterns and examine the sugar. A smoke was suggested, and for this purpose they proposed to adjourn to a small log hut. The companion of my friend, in pushing open a rude door, suddenly drew back, saying somebody was hanging in the hut. They struck a light, and much to their horror discovered the body of a woman hanging from the roof. She was perfectly dead. They felt themselves in a dreadful position, but wisely concluded to at once make for a police-office, some miles off, and state what had happened. The result of a coroner's inquest, which of course they had to attend, elicited the facts that the woman was a kind of travelling pedlar, who was last seen at a public-house about a mile off. It was concluded that she had entered this hut and committed suicide. Nothing so terrible happened to ourselves, but to a great extent I can sympathise with my brother, and always preferred company on the rounds.

Unfortunately I have not a complete record of our captures during this visit. Most of the insects mentioned as taken in June the year before were still 'out, and *Sponsa*, *Promissa*, *Aureola*, *Miniata*, *Monacha*, *Dipsacea*, *Fuscula*, and hosts of *Tortrices* and *Tinæ* may be added to the list. Sufficient has been said, however, I think, as to the profusion of lepidoptera to be collected in the neighbourhood of Brockenhurst, to make our younger members long to pay it a visit; should this be the case, I would say by all means do so, and I only hope they will derive as much pleasure as myself, and in after years be able as I am now to recall the weeks passed there as amongst the happiest in their memory.

Huyton Park,
Near Liverpool.

Short Notes and Queries.

Nola cristulalis AND *Agrotera nemoralis* IN KENT.—The little *Nola cristulalis* seems rather common here; I saw at least about twenty specimens on about six trees. On May 24th I took ten lovely specimens of *Agrotera nemoralis* in East Blean Wood; they were just out.—J. P. BARRETT, Margate.

Anarta melanopa.—This moth is plentiful on some of the Scotch mountains this year. I have just added to my collection a beautiful series taken there at the end of May, and have also a nice brood of larvæ feeding on sallow and knotgrass.—GEO. T. PORRITT, Huddersfield.

ENTOMOLOGICAL NOTES.—*Meliana flammea* has again been common in Wicken Fen this year, one collector having taken as many as twenty in a night. A friend, too, has bred long series of *Acronycta alni* and *Stauropus fagi* from larvæ taken in the New Forest last autumn.—G. T. PORRITT.

A PLAGUE OF *Heliophobus popularis*.—A correspondent at Clitheroe writes :—"Great commotion prevails in Clitheroe and the towns surrounding the famous Pendle Hill, in consequence of an extraordinary phenomenon. The cause of the excitement is the arrival of a huge quantity of insects which occupy the ground from Wiswell to Mearley, near Pendle Hill, a distance of about three miles. They travel together in thousands at a good speed, and devastate the land over which they pass to an alarming extent. The inmates of a roadside inn are kept continually at work brushing them out of the house. The road is almost black with the insects, which are of a strange kind, being about an inch long and of a dark colour. Hundreds of persons are continually going to view them, and numbers of the insects are exhibited in the shop windows." Through the kindness of Rev. Edwd. Boden, of Clitheroe, we have received two specimens of the insect referred to above, which are evidently the larvæ of *Heliophobus popularis*. Their occurrence in such numbers is most extraordinary, and we should think quite unprecedented in this country. Another species similar in habit, *Charceas graminis*, often causes great destruction in Sweden, laying waste the meadows and annihilating the hay crops ; and several occurrences of almost equal destructiveness by this insect in our own country are also on record. We should not be surprised if many, probably most, of these Clitheroe larvæ prove to be the latter species ; and they may also include a third species of similar habits, namely *Luperina cespitis*.—Eds. Nat.

NESTING OF THE JACK-SNIPE.—In your last number we are asked to believe that the jack-snipe—a bird that has hitherto never been proved to nest in the British Isles or any country of Europe of equal southern latitude (excepting Russia)—has bred in this country, and this, on the strength of evidence which is most eminently unsatisfactory, viz. : the mere fact of a nest and eggs being found *one* day, and the perfectly unconnected circumstance that a jack-snipe was shot in the same locality *two* days after. We are also informed that the eggs were those of the normal type. Unfortunately the eggs of the jack-snipe lack decidedly discriminating characteristics, and are fac-similes of small specimens of those of the common snipe, being only a trifle less, and very large when the size of the bird is taken into consideration, in this respect proportionally much larger than eggs of the common snipe. Although Mr. Hanson considers that the facts stated by him are proof positive, to me they are wholly unworthy of consideration ; and I venture to opine that no ornithologist in this country will, after so many false alarms, place any reliance in the eggs of the jack-snipe being obtained here

unless the old bird is actually snared upon her eggs. In conclusion, I may say that the eggs in the possession of Mr. Lumb will, I think, prove to be those of the dunlin or the common snipe.—WM. EAGLE CLARKE.

BITTEN BY A VIPER.—We regret to announce that the veteran president of the Wakefield Naturalists' Society, Joseph Wainwright, Esq., F.L.S., when endeavouring to capture one of the above venomous reptiles at Wentbridge, on Saturday, the 18th June, was bitten by it in the finger. None of the party had any ammonia, and it was consequently some time before any proper assistance could be given, and we understand that Mr. Wainwright therefore lies in a very critical condition. We are quite sure that all our readers will join us in expressing our sympathy, and earnest hope that no serious consequences will ensue, and that Mr. Wainwright may be speedily restored to health.—EDS. *Nat.*

Tetradontium Brownianum AT STALEY BRUSHES.—In the report of the Manchester Cryptogamic Society in last month's *Naturalist*, Mr. Cash is mentioned as having discovered *Tetradontium Brownianum* in Staley Brushes. This is really not a discovery, as I and several of my friends have known the above moss to occur at Staley Brushes many years back. On referring to my herbarium I find that my specimens from that locality are marked "Feb., 1867." I also beg to report the occurrence in this district of *Plagiothecium Borrerianum*, with good fruit. It was found so far back as May, 1872, by Messrs. T. Ashton and J. Nield, in a wood near Marple. I have much pleasure in stating that it still produces fruit in the same locality, as I and my friend Mr. Holt gathered good specimens on the 5th of June.—JNO. WHITEHEAD, Dukinfield, 17th June, 1881.

NOTICES OF BOOKS, &c.—"INSECT VARIETY: its Propagation and Distribution, by A. H. Swinton. London: Cassell, Petter, & Galpin, 1881."—There can be no doubt that the mass of our amateur and local naturalists, so-called, are simply so in name, and content themselves with collecting specimens, naming or getting them named for them, exchanging such specimens with other collectors, and placing them when so named in cabinets, drawers and herbaria, and here their work, good in its way, stops. More especially we believe is this the case with entomologists—and chiefly so amongst lepidopterists. There be many estimable collectors who can tell us, from wing-markings and similar superficial data, what is the name of any insect and its comparative rarity and value. But how few amongst them can go any further, or know anything of insect economy, anatomy and physiology, or the connection and bearing of entomology with other cognate sciences. This is a grave error on the part of such persons, and one which we hope to see, ere long, eliminated; and any assistance or incentive to study the whole life-history of this exceedingly interesting class of animal life should be welcomed by all true naturalists. Such a help and incentive, not the

first in the field we know, is now before us, and we heartily recommend its careful perusal by all entomologists. We further trust that such perusal and study will, to them, be an incentive to study their favourite science in a philosophical spirit. In his introduction, Mr. Swinton gives us an account of his early studies in entomology, and tells us how he was led to improve upon mere collecting by studying the habits and anatomy of insects. In the other chapters he gives a detailed account of the results of his researches; the passions of insects, their senses of touch, smell, hearing, their circulation, luminosity, stridulation, musical capacities, and the organs used for these varied purposes, their situation, connection and methods of use; the whole of these being illustrated by numerous well-executed plates of dissections, nervous system, and varied actions, in all the orders of insects. A useful chapter is devoted to the connection of all these phenomena, with migration, shewing how together they induce variation and natural selection. The style in which the book is written renders it eminently readable even by non-entomologists, though it is open to question whether this semi-poetical method of treatment will be pleasing to all readers. That is a matter of taste. Whilst welcoming this book as a great step in the right direction, and one which we trust will bear useful fruit, as it deserves to do, we cannot overlook that it bears the marks, in occasional badly-constructed sentences and other slight errors, of having been composed too hastily. Though these blemishes do not impair the general usefulness of the work, we hope to see them removed in future editions.—[Eds. *Nat.*]

Rainfall for May.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1881.	1880.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·19	11	11·31	* 12·03	17—26	0·21
HALIFAX... (F. G. S. Rawson)	360	3·30	13	17·34	15·20	..	...
WAKEFIELD (E. B. Wriggles- worth)	100	·77	12	9·14	...	26	0·26
STANLEY..... (do.)	250	·76	11	8·65	...	26	0·23
THORNES..... (do.)	90	·81	11	9·13	...	26	0·27
BARNESLEY ... (T. Lister) ...	350	·82	10	8·78	9·93	26	·40
INGBIRCHWORTH (do.)	853	2·75	11	13·22	14·66	26	1·20
WENTWORTH CASTLE (do.)...	520	1·98	11	11·50	11·17	26	1·23
GOOLE ... (J. HARRISON) ...	25	·81	9	8·14	7·64	26	·26

* This is the average to date for 15 years, 1866-80.

Reports of Societies.

BARNSELY NATURALISTS' SOCIETY.—Mr. Lister forwards a few notes of bird arrivals, and promises a tabulated comparative list for next issue. Amongst other arrivals in the Barnsley district are two or three instances of the nightingale, besides several reports of the same which have proved to be erroneous. In all these cases an amount of drunkenness and ruffianism has occurred amongst the nightly visitors to hear the birds, which Mr. Lister characterises as disgraceful. It is a great pity that the law fails to meet such cases.

BRADFORD NATURALISTS' SOCIETY.—Meeting May 24th, Mr. Spencer in the chair.—The chairman read an instructive paper on “Plant-lore,” in which he showed how the names of many plants, both British and exotic, were derived from some real or supposed resemblance to various animals. Mr. West exhibited a number of lichens, amongst which were *Parmelia lanata* from Ben Mac-dhui; Mr. Soppitt, a number of plants, amongst which were *Primula farinosa*, *Puccinia adoxæ*, &c.; Mr. Andrews, *Otiorhynchus sulcatus* from Heaton, a destructive beetle in vineries.

MEETING June 14th, Mr. W. Jagger in the chair.—Mr. C. E. Waddington read an instructive paper on “Elementary Conchology,” in which he explained the nature of land and water mollusks, their structure and mode of growth. Mr. West exhibited and made remarks on *Orthotrichum Ludwigii*, *Eucalyx obovata* in fruit (Ben Lawers), *Platysma nivale* (Ben Mac-dhui), *Lemanea fluviatilis*, and *Plagiochila tridenticulata* (Miller's Dale); Mr. Firth, several local insects, amongst which were *C. corylata*, *C. suffumata*, and *P. petraria*; Mr. Illingworth, *B. rubi* from Skegness, and a fine specimen of the common lizard (*Zootoca vivipara*) from Rombalds Moor. Mr. Emley sent a specimen of *A. cardamines*, an insect new to the district record list. Mr. Soppitt, *Æcidium quadrifidum* and other micro-fungi.—H. T. SOPPITT, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting May 23rd, Mr. S. L. Mosley in the chair.—Messrs. Shaw, Fisher, Wilkinson, Sykes, Woodhead and Bartlam laid on the table the following specimens:—*Drosera rotundifolia*, *Pinguicula vulgaris*, *Valeriana dioica*, *Circæa lutetiana*, *Andromeda polifolia*, *Pedicularis sylvatica*, *Rhinanthus Christagalli*, *Inula dysenterica*, *Hypericum pulchrum*, *Empetrum nigrum*, *Sanicula Europæa*, *Enanthe crocata*, *Chrysosplenium oppositifolium*, *C. alternifolium*, *Orchis Morio*, *O. Masculula*, *Carex præcox*, *C. pulicaris*, *Ophioglossum vulgatum*, *Botrychium lunaria*, *Polypodium Phegopteris*. Mr. B. Senior, specimens of the blind lamprey. The lamprey was an inhabitant of most of our rivers, until they became so extremely polluted. Messrs. Mosley, Bickerdike and Ellis showed *Anticlia badiata*, *Cidaria prunata*, *Vanessa*

urtica; Mr. S. L. Mosley, the stomach of a female jackdaw, containing fibrous roots and the remains of beetles; and that of a male jackdaw, which was full of beetles; also of a nightjar, containing parts of beetles and moths; Mr. F. Ellis, a number of specimens of beetles taken from the dock, also some weavils.

MEETING June 4th, the president in the chair.—The following specimens were shown:—*Festuca ovina*, *F. durinsecula*, *Poa pratensis*, *P. trivialis*, *Bromus mollis*, *B. erectus*, *Aira flexuosa*; *Lolium perenne*, *Anthoxanthum odoratum*, *Ophioglossum vulgatum*, *Fumaria officinalis*, *Senecio Saracenicus*, *Oegopodium podagraria*, *Lepidium draba*, *Galeobdolon luteum*, *Splachnum sphaericum*, and many others. Mr. McKenzie laid on the table a number of seeds from Australia. In entomology Messrs. Ellis, Midgley, and Mosley laid on the table various lepidoptera, including *Fidonia piniaria* and *Hadena glauca*. Messrs. Ellis and Midgley also showed two hornets' nests. Mr. G. P. Stather then read a paper on "Ants."

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting, the vice-president, Mr. N. Cooke, in the chair.—Mr. H. H. Corbett, of Cheadle Hume, read a paper on "Some secondary Sexual Characteristics in Common Insects," in which he considered the differences in structure which are often observed in the sexes of insects, generally tending to a higher development of some of the organs in the male sex, such as greater power of locomotion, brighter colors, and a greater development of the antennæ, &c. In many cases he explained the reason of this difference in structure. During the conversazione which followed, Mr. N. Cooke exhibited some Scotch insects recently collected by himself; the Rev. H. H. Higgins exhibited a number of lepidoptera, accompanied by the preserved larva and pupa of each species, collected by Mr. Dunkenfield Jones, at San Paulo, Brazil; Mr. Johnson, a specimen of *Ennomos alniaria*; the secretary, Mr. Ellis, a smoky variety of *Phigalia pilosaria*, from Bradford; and Mr J. Wall distributed living specimens of *Lepisma saccharina*, the scales of which are used as test-objects for the microscope.—J. W. ELLIS, Hon. Sec.

MANCHESTER CRYPTOGRAMIC SOCIETY.—Monthly meeting, Monday, June 16th.—Captain Cunliffe, vice-president, in the chair. Mr. W. H. Pearson exhibited specimens of *Gymnomitrium crassifolium* gathered on Ben Nevis by Mr. W. West; *Jungermannia laxifolia* from Glydr Vaur, collected by himself, and abundant specimens of *Nardia alpina* recently collected during an excursion to Bowfell in company with Mr. Geo. Stabler. According to Dr. Gottsche this species had not previously been found in perfect fruit. Mr. Cunliffe exhibited specimens of that rare and critical species, *Gymnostomum squarrosus*, which it is interesting to note was found so near home as Handforth; also *Pleuridium alter-*

nifolium from Styal, and *Zygodon conoideus* from Barmouth. Mr. Cash gave a brief account of a recent visit along with Captain Cunliffe to the valley of the Wharfe, and described the finding of such rare mosses as *Encalypta streptocarpa* in fruit! and *Orthodontium gracile* and *Tetraphis pellucida* in the same interesting condition; specimens of the latter species he kindly distributed. The rest of the evening was spent in examining a fine collection of European mosses, which had been presented to the Manchester Free Reference Library by the executors of the late John Windsor. The collection had been made by the late Prof. Schimper, and was in excellent condition, the specimens being very ample, and a large number of them rare as British species: fruiting specimens of *Lescuræa striata*, *Mnium spinosum*, *M. stellare*, *Hypnum Halleri*, and others equally represented. The members were much pleased with the examination, and expressed their gratitude towards the donors for their generous gift to the town.—T. ROGERS, Hon. Sec.

WAKEFIELD NATURALISTS' AND PHILOSOPHICAL SOCIETY.—Meeting June 1st, Dr. Crowther, V.P. occupied the chair, and exhibited two living species of German and Italian snakes of the genus *Lepidonotus*, in allusion to which he made some remarks upon the habitat, life, and method of locomotion common to each species. Mr. Thomas Mason showed the whipcord snake from Java, and the spotted snake from India, both in spirits.—E. B. W.

YORKSHIRE NATURALISTS' UNION.—Hornsea, Whit-Monday, 6th June.—Favoured with a bright sun and an unclouded sky, the members of the Union had a very pleasant day. The collections obtained were valuable and numerous. Due attention was paid to the natural beauties of the neighbourhood, and the various objects of interest with which it abounds, these including the broad band of loose, heavy, sloping sands, stretching beneath a line of clayey cliffs upon which the sea is making rapid and serious inroads; the ancient church, built upon a vaulted crypt, used, it is said, at one time, as a receptacle for smuggled goods, and containing an alabaster tomb of 1430 of Anthony St. Quintin; and the hollow lands known as "The Carrs"—once a region of bog and water, covering the remains of an ancient forest. Amongst other spots around which the naturalists lingered was Hornsea Mere, with its reeds, shallows, and wild fowl—its wooded islands, and, at one end, its belt of thickly growing trees, forming an agreeable shade from the almost tropical heat of the sun. Permission to visit the Mere estate had been obtained from Mr. Constable. The Mere, it may be mentioned, is of special interest to ornithologists, and has produced some of the rarest Yorkshire specimens. Several rare species of beetles have also been found. As yet the district around Hornsea has been but little explored by conchologists, but there is little doubt that careful research would considerably extend the list of species. *Pisidium roseum* has been taken in the Mere, and much variety of form exists in the *Anodons* from the same place. It was four o'clock

before the naturalists had completed their researches, and shortly after that hour they adjourned to the Alexandra Hotel for tea. Subsequently the sections met for the purpose of classifying the various specimens, and afterwards the general meeting was held. Mr. C. P. Hobkirk, F.L.S. (Huddersfield), v.p., presided, and the following societies were represented:—Bradford Naturalists' Society, Bradford Scientific Association, Driffeld Naturalists' Society, Goole Naturalists' Society, Huddersfield Naturalists' Society, Huddersfield Literary and Scientific Association, Huddersfield Scientific Club, Hull Naturalists' Society, Leeds Conchological Society, Leeds Geological Society, Leeds Naturalists' Field Club, Malton Naturalists' Society, and Selby Naturalists' Society. Several new subscribers were added to the Union, and a vote of thanks was passed to Mr. N. F. Dobrée, of Beverley, for his services as local secretary.—Mr. S. Jefferson proposed a vote of thanks to H. S. Constable, Esq., for his permission to visit the Hornsea Mere estate. Mr. Dobrée stated the result of the investigations of the entomological department, remarking that the section had little to report, owing to the early date of the meeting and the inclemency of the spring. Of lepidoptera, diurni were not seen beyond the commonest species; of geometræ the most noteworthy were *Acidalia emarginata*, *Melanippe montanata*, and *Emmelesia decolorata*, the latter being new to Holderness. Mr. T. E. Holder, of Hull, the only coleopterist present, reported coleoptera more abundant; *Athous hæmorrhoidalis*, *Otiorhynchus picipes*, *Hister bimaculata*, were taken, and also seven species which have been submitted to Mr. Wigglesworth to be named, but whose report is not yet received. The day's doings in botany were reported upon by Mr. F. Arnold Lees, F.L.S. Of phanerogams eighty species had been observed in bloom, of which the following were the most noteworthy:—*Thalictrum flavum*, *Ranunculus circinnatus*, *Cochlearia danica*, *Silene maritima*, *Honkeneja peploides*, *Geranium columbinum*, *Hippuris vulgaris*, *Myriophyllum eu-spicatum*, *Ceratophyllum aquaticum*, *Sium latifolium* (border of Mere), *Menyanthes trifoliata*, *Convolvulus Soldanella*, *Hottonia palustris*, *Plantago Coronopus*, *Rumex Hydrolapathum*, *Hydrocharis Morsus-ranæ*, *Elodea canadensis*, *Orchis Morio*, *O. ustulata*, *O. incarnata*; *Habenaria viridis*, *Carex arenaria* (sands by sea), *Carex paludosa*, *C. riparia*, *Glyceria aquatica*, and *Elymus arenarius*. The eight of the foregoing placed in italics are "New County Records," i.e. they are additions to the divisional distribution given in "Topographical Botany," not having been published before for the vice-county 61—the south-east fifth of Yorkshire. The *Elymus*, the *Sium*, and the *O. incarnata* were only recently placed on record for the division in the B. record Club Reports. In cryptogams little was done during the day. One fern—*Ophioglossum vulgatum*—worthy of mention, was seen; no mosses beyond the very commonest; three kinds of common corticolous lichens occur in some luxuriance on trees on the islands in the Mere—*Evernia*, *Ramalina*, etc.; and three micro-fungi were collected: *Puccinia ægopodii*, *Æcidium rubellum* and *Æ. valerianacearum*.

Marine botany produced one object only. The chairman remarked that Mr. W. West, of Bradford, the secretary for cryptogamic botany, had been obliged to resign his position, owing to pressure of business.—It was resolved to accept his resignation, and to forward a vote of thanks to him for his services. Mr. W. B. Russell, secretary of the geological section, said the only strata in the neighbourhood were the glacial and post-glacial. It seemed that the common boulder clay was characterised by being very densely crammed with blocks of rocks. They found the carboniferous limestone, the millstone grit, the permian rocks, the red chalk, &c. An enormous block of chalk was seen—21 yards long and 6ft. thick—in the midst of post-glacial gravel. Amongst other things were a great amount of roots of various trees and the seeds of plants.—The Rev. H. H. Slater reported on the vertebrate zoology section, stating that thirty birds—twenty-one resident and nine non-resident—had been noticed. The list is as follows: *r* denoting Resident; *v* Summer Visitor and *b* breeding.—Thrush, *r* and *b*; missel-thrush, *r*; robin, *r*; garden-warbler, *v*; white-throat, *v*; reed warbler, *v* and *b*, abundant; pied wagtail, *r*, probably in small numbers; meadow pipit, *r*, in small numbers; hedge sparrow, *r* and *b*; greenfinch, *r*; chaffinch, *r* and *b*; house sparrow, *r* and *b*; reed bunting, *r* and *b*, abundantly by Mere; starling, *r*; rook, *r*; carrion crow, *r* and *b*; swallow, *v*; house martin, *v*; sand martin, *v*; skylark, *r*, probably in small numbers; swift, *v*; ringdove, *r*; waterhen, *r* and *b*; coot, *r*, though to some extent migratory in autumn; common gull, *r*; herring gull, *r*; pochard, *r* and *b*, unusually abundant; mallard, *r* and *b*; great-crested grebe, *r*, doubtless breeding; mute swan, *r* and *b*. In addition to this list, the heron, which was believed to breed at Hornsea Mere, was conclusively proved not to do so, and it is probable that it has not done so for nearly ten years. The quail has nested at Ulrome near here, on the authority of Mr. Boynton; and the shoveller, which did not exhibit itself to the Union on June 6th, breeds there annually in small numbers, according to Mr. Boys. Mr. W. D. Reebuck stated that the conchological section had met with the best success of any of the sections. Thirty species had been found, of which eleven were new to the district, and one species, *Planorbis lineatus*, was recorded for the first time in the East Riding. It was abundant at Askham Bog, near York. Only five species of land shells were observed, the members of the section having devoted their attention specially to the fresh-water species of the Mere, which seems to be particularly rich in the rarer kinds. The following is the list:—*Sphæreum corneum*, *S. lacustre* (new), *Pisidium* (roseum?), *Anodonta cygnea*, *Bythinea tentaculata*, do. var. *decollata* (new), *B. Leachii* (new), *Valvata piscinalis* (new), *V. cristata* (new), *Planorbis lineatus* (new to E. R.), *P. nautilus* (new), *P. albus* (new), *P. vortex*, *P. carinatus*, *P. complanatus*, *P. contortus* (new), *P. corneus* (new), *Physa fontinalis*, *Limnæa peregra*, do. var. *ovata*,? *L. palustris*, *L. stagnalis* (new), *L. truncatula*, *Ancylus lacustris* (new), *Arion ater*, *Limax agrestis*, *S. putris*, *Z. nitidus*, *H. caperata*, do. var. *ornata*.





